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Sinister Realism
On ARRI Alexa Plus

THE 2001 FILE
Art Director Harry Lange's
Landmark Designs

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ON THE COVER:

Jennifer Lopez stars in the NBC series *Shades of Blue*. Photo by Jeff Riedel/NBC

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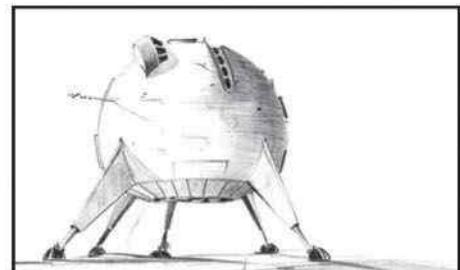
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INSIDE STORY Welcome to the second issue of *HDVideoPro* for 2016, a year that kicked off with the annual Sundance Film Festival drawing major crowds to Park City, Utah. We were in attendance, and the first thought on the minds of many after so many sales bombed at the box office last year was, what films will sell?

Early buzz on features in competition included *Swiss Army Man*, quickly pegged as the film with, yes, the “farting corpse” (played by Daniel Radcliffe), which won the Directing Award in the U.S. Dramatic category. The indie was picked up by A24, one of the few studios to score deals.

Indeed, Sundance 2016 will go down as the year of streaming, as the likes of Netflix and Amazon acquired worldwide rights to many quality films screening at the festival.

It was Fox Searchlight who scored the biggest buy, however, paying a record-breaking \$17.5 million for Nate Parker’s *The Birth of a Nation*, which earned both the Sundance Grand Jury Prize and the Audience Award. A full review of Sundance is in the pages ahead, with reviews of indies that pushed the boundaries of filmmaking.

Among the new equipment we review is the Leica SL, a full-frame mirrorless



Courtesy of Sundance Institute

camera that’s a newcomer to 4K capture. It’s a beautiful entry from the Red Dot, designed with the connoisseur in mind. The Canon EOS C300 Mark II is a user-inspired update, offering better image capture and a stronger housing than its predecessor. New features include the ability to garner 12-bit, 4:4:4 quality imagery at 2K, ripe visuals allowing for incredible color manipulation in post.

We’re excited to bring you an inside look at *The 2001 File: Harry Lange and the Design of the Landmark Science Fiction Film* from Reel Art Press, a wonderful book filled with stunning photographs and illustrations courtesy of art director



Harry Lange for Stanley Kubrick's *2001: A Space Odyssey*. The volume reveals, for the first time, the evolution of the film's immersive look, considered to be the greatest science-fiction film of all time. Pages of intricate sketches detail everything from early design concepts through to the visuals that finally appeared in the film.

Our features in this issue demonstrate how cinema is truly alive and well—on our home TV screens. DP Crescenzo Notarile, ASC, AIC (*CSI: Crime Scene Investigation*, *Ghost Whisperer*), reveals his approach to capturing Fox's *Gotham* using old cinema lenses to frame characters' faces against a

backdrop drenched in moody hues and eerie shadows. Crescenzo explains why he likes using old glass on the show, creating a softer look that recalls glamorous Hollywood pictures of old. *Shades of Blue* gets the cinematic treatment from Stefan Czapsky, ASC (*Edward Scissorhands*, *Batman Returns*, *Blades of Glory*), who discusses why old zooms such as the classic Angénieux Optimo 24-290mm T2.8 allow him to capture unique visuals on the NBC show. Shooting mainly on the ARRI ALEXA Plus, Czapsky also uses a variety of additional equipment solutions, including Blackmagic and Panasonic gear.

Collide rides into view, an adrenaline-

fueled feature shot by Ed Wild (*Welcome to the Punch*). The DP shares with us the many challenges the shoot presented, including high-speed car chases and motor mayhem on the Autobahn in Germany, all captured in 5K on RED EPIC equipment.

Finally, our focus on lighting will pique your interest, as we break down the choices available when putting together a project on any budget. You'll find information and advice on the latest tools and developments in HMI, tungsten, LED and fluorescent technologies to best illuminate your storytelling.

—Simon Wakelin, Editor
editors@hdvideopro.com

HD Independents

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The Sundance Film Festival welcomed the world to Utah once again, continuing its mission to introduce us to a diverse mix of highly entertaining and culturally significant work from around the globe

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Shades Of Blue

The NBC police drama *Shades of Blue* stars Jennifer Lopez as a compromised Brooklyn detective-turned-FBI informant and Ray Liotta as her lieutenant who begins an all-consuming hunt to find the traitor. Shot by cinematographer Stefan Czapsky, ASC (*Edward Scissorhands*, *Batman Returns*, *Ed Wood*), the show's polished, cinematic look is a credit to the DP and executive producer Barry Levinson (*Rain Man*, *And Justice for All*), who directed the pilot and first episode, and series creator and writer Adi Hasak (*Generation Kill*, *3 Days to Kill*). The DP shot with the ARRI ALEXA Plus and Angénieux Optimo zooms and old Zeiss T1.3 lenses, but found creative solutions in other tools, from the Blackmagic Pocket Cinema Camera to Smith-Victor Photoflood "scoop" lights.





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Gotham

Captured in gritty, moody realism by rotating DPs Crescenzo Notarile, ASC, AIC (*CSI: Crime Scene Investigation*, *Ghost Whisperer*), and Chris Narr (*Sinister*, *Believe*), Fox's *Gotham* chronicles the early days of James Gordon (Ben McKenzie) and Bruce Wayne (David Mazouz), and the origin stories of classic Batman villains. "We have a lot of creative license to raise the bar and stretch it visually," says Crescenzo on shooting the show with Narr. "We get to reinvent and stylize the show and add our personal signature." Crescenzo's main camera is the ARRI ALEXA Plus with Panavision lenses. For their work on *Gotham*, both cinematographers have been nominated by the ASC for Outstanding Achievement in Cinematography in a Regular Series. The show is led by EP Danny Cannon, producer Scott White and creator/EP Bruno Heller.

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THE SCARLET LETTER

RED's **SCARLET-W** is the latest addition to their RED DRAGON family of cinema cameras. Updating the SCARLET-series 5K camera system to heightened frame rates of up to 60 fps (48 fps in the previous iteration), the SCARLET-W is also capable of impressive 4K slow-motion at 150 fps, 3K at 200 fps and 2K at 300 fps. With integrated mounting points and interchangeable-lens mount options (historically, your choice of Canon, Nikon, Leica or PL), the 3.5-pound SCARLET-W is capable of simultaneous REDCODE RAW and Apple ProRes 422/422 LT/422 HQ, as well as in-camera 3D LUT output, a maximum data rate of 140 MB/s (when used with RED MINI-MAG capture cards) and a potential 16.5+ stops of dynamic range. The 13.8-megapixel CMOS RED DRAGON sensor is available in color or monochrome, which produces enhanced resolution and dynamic range over the standard sensor. The interchangeable, intelligent OLPF (optical low-pass filter) system is available in three iterations: standard configuration, heightened light sensitivity or better skin tone renditions. A SCARLET-W Base I/O V-Lock package comes with key components like an AI Canon mount, V-Lock battery mount, 120 GB RED MINI-MAG, DSMC RED Touch 4.7-inch LCD monitor, DSMC AC power adapter and DSMC Universal Handle for a ready-to-shoot solution right out of the box. List Price: Begins at \$9,950. **Contact:** RED, red.com.



X MARKS THE SPOT

With DCI 4K video at 60p and HD at 120 fps, a first for EOS cameras, the **EOS-1D X Mark II** is the new top-of-the-line, full-frame DSLR from **Canon**. With a 20.2-megapixel CMOS sensor and Dual DIGIC 6+ image processors, the 1D X Mark II utilizes Canon's Dual Pixel CMOS Autofocus technology for touchscreen focus and quiet camcorder-like tracking and facial recognition that has been enhanced through a 360,000-pixel RGB+IR metering sensor. With expandable ISO settings of up to 409,600, the camera is compatible with both CF and CFast memory cards for optimal writing performance. For promotional materials and more, the 1D X Mark II can also do in-camera frame grabs from captured 4K video. Still camera features include up to 170 consecutive RAW images in 14 fps bursts and 16 fps in Live View mode, improved autofocus, built-in GPS geotagging and a weather-resistant magnesium body. There's a built-in headphone jack for audio monitoring. List Price: \$5,999 (body); \$6,299 (Premium Kit with 64 GB CFast memory card and reader). **Contact:** Canon, usa.canon.com.

WIRELESS LENS CONTROL

Compatible with popular cameras from RED, Canon, Sony, ARRI and Blackmagic (which requires an additional cable sold separately), **Movcam** has entered the lens-control market with their first wireless system. Available in Single Axis and Dual Axis, the lens-control systems are based around the SCU-1 Hand Control, a modular unit with a silent motor that can be upgraded to dual channel with the addition of an extra motor and necessary modules. A standard Sony NP-F570/F550 2600 mAh battery powers the systems (not included). Indoor transmission ranges up to 30 meters and outdoor transmission up to 200 meters, with a transmission delay of less than 12ms. A 1.56-inch OLED screen shows settings and is readable in sunlight. Both models are adjustable with configurable lens motor torque, as well as automatic calibrations. They come with a carrying case. List Price: \$5,995 (Dual Axis); \$3,995 (Single Axis). **Contact:** 16x9 Inc., 16x9inc.com.





TOTALLY TUBULAR

Crafted with sturdy aluminum frames, the **Sunray Translyte LED systems** house 6-, 12- or 24-tube setups in lengths of 4 feet. The hard-body fixtures include onboard, two-circuit dimmers with local, DMX or wireless control over a smooth curve of output that can be reduced to less than 10% with no shift in Kelvin color temperature. The harness with locking end caps will allow for blending of both tungsten and daylight, which are available at 3200K and 5600K. LED tubes come in clear or frosted at approximately 50% less output. The Translyte fixtures can be affixed with diffusion or bounce materials such as solid or silk skirts and fabric egg crates through Velcro® on the front. The full fixtures also can be bolted side-by-side or stacked to build a wall of light. List Price: \$2,988 (Translyte 406 fixture without tubes); \$5,288 (with tubes); \$3,988 (Translyte 412 fixture without tubes); \$7,948 (with tubes); \$4,388 (Translyte 424 fixture without tubes); \$12,308 (with tubes); \$330 (Filmgear 4-foot T12 LED tubes in daylight or tungsten/clear or frosted). **Contact:** Sunray, sunray-lighting.com.

ON THE ROAD

The 3.9-pound **Panasonic Toughbook 20** functions as both a lightweight laptop and a detachable 10.1-inch tablet. Unlike many other convertibles, the Toughbook 20 is built for rugged use, with a magnesium-alloy chassis, security options like fingerprint identification, an 800-nit sunlight-viewable multi-touch display (that even will work with gloved hands), a weather- and water-resistant rating of IP65 and a MIL-STD-810G design for sturdiness against drop, shock, vibration, rain, dust, sand, altitude, freeze/thaw, high/low temperature, humidity and explosive atmospheres. The built-in handle also functions as a kickstand, and an optional bridge battery will allow for hot-swap battery replacements, which can be done in the field without disruption to operation. The Toughbook 20 runs with Windows 10 Professional, and there's a Windows 7 Pro downgrade option available. There are several ports including microSDXC, HDMI, Ethernet, Optional Serial, Headphone/mic, Micro-SIM and three USB connections via the keyboard dock. For field use, there's also an option for a 4G LTE multi-carrier. Estimated Street Price: Begins at \$3,099. **Contact:** Panasonic, business.panasonic.com/Toughbook.



LOW RIDER

Designed by dolly grip James Saldutti, the **Dutti Dolly** from **Matthews Studio Equipment** is a multi-configurable system that's lightweight for portability and versatile for low-to-the-ground shots. The Dutti can fit in tighter spaces than a conventional dolly, like airplane or bus aisles, and its stability allows it to be used with tripods or bazooka mounts for height. It can roll on the ground or be run on stands or a track on either the top or bottom. At 20"x24", the Dutti Dolly is based on a rectangular aluminum plate support with eight inline skate wheels that mount in pairs for shots that ride extremely close to the ground. List Price: Begins at \$1,399. **Contact:** Matthews Studio Equipment, msegrip.com.

LED FRESNEL

Dracast's affordable new **Fresnel Series** are DMX-controllable studio fixtures that offer the benefits of energy-efficient LED with the output of classic Fresnel designs. The fixtures generate very little heat in a silent system ideally suited for studio applications. They're currently available in five sizes: Fresnel200, 500, 700, 1000 and 2000. The Fresnel2000 produces the same amount of light as traditional 2K while only using 200 watts. Available in 3200K (Tungsten), 5600K (Daylight) and 3200K-5600K (Variable CCT), all three color temperature models deliver a 95 CRI color rendition with 0-100% dimming that can be performed remotely via 3-pin DMX in/out ports or locally with onboard controls. Each model includes 4-way barndoors with a mounting yoke. List Price: Begins at \$595. **Contact:** Dracast, dracast.com/Fresnel.





VISUALIZATION IS KEY

Featuring animated and easily alterable storyboards, **Storyboard Artist 7** adds enhanced 3D capabilities, plus an unlimited number of character poses, advanced motion graphics and mobile app integration to the previsualization software suite. Native screenplay formats from Final Draft, Microsoft Word and Screenwriter can be brought into the interface where you can plug in sequences alongside text. Built-in art, video imports and real-world backgrounds with masking tools, as well as Photoshop layer support, let you intuitively add characters to high-resolution backdrops that are easily maneuverable thanks to articulation points and an extensive library of scenes and avatars. Lighting, effects, perspective control, audio and camera movements can be utilized in cuts and exported as QuickTime, Flash or customizable presets, which then can be imported into NLE software from Adobe, Apple, Avid and others to produce temporary edit tracks. Upgrade pricing is available for previous users. List Price: \$499; \$199 (upgrade). **Contact:** PowerProduction Software, powerproduction.com.



IPHONE LAVALIERS

Sennheiser has teamed with **Apogee** to release lavalier microphone solutions that capture directly to an iOS device via a Lightning connection. Available in two models, the **ClipMic digital** and **MKE 2 digital** combine Sennheiser microphone technology with Apogee's A/D conversion process for a captured audio resolution of up to 24-bit/96 kHz when used with Apogee's MetaRecorder app. MetaRecorder also includes mic levels, recording presets, multi-take capture, tagging, metadata, file organization and Dropbox integration. A headphone socket on each mic provides audio monitoring. The MKE 2 digital solution steps up audio capture from the ME 2 capsule in the ClipMic digital to the MKE 2 microphone, which offers a superior signal-to-noise ratio and durable Umbrella diaphragm design to impede moisture from entering the acoustics of the capsule. MetaRecorder is free with purchase of a Sennheiser or an Apogee device or \$4.99 to unlock through in-app purchasing. List Price: \$499 (MKE 2 digital); \$199 (ClipMic digital). **Contact:** Apogee, apogeedigital.com; Sennheiser, sennheiser.com.

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At 5.8x2.8x2.2 inches and 16 ounces, **Zylight's Newz on-camera phosphor light** is capable of a variable color temperature range of 3200K-5600K while outputting a CRI of 95 for high color rendition. The beam angle can be honed from 60° to 90° and, with 0-100% dimming and a one-touch quick-release mount, it's an excellent solution for run-and-gunners who need to move quickly from indoors to outdoors. The light combines a phosphor substrate with Quantum nanoparticles for a low-consumption light that can be powered through a worldwide AC power adapter or standard 7.2V or 14.4V camera batteries. The Newz also features an operational temperature range of -20 to +40 C and an IP54 rating for water-resistance in inclement weather. Estimated Street Price: \$429. **Contact:** Zylight, zylight.com/newz.



COLOR FIDELITY

Providing filmmakers, cinematographers, colorists, editors, videographers and motion photographers with consistent, predictable and repeatable color results from frame-to-frame and camera-to-camera, **X-Rite's ColorChecker Video** and **ColorChecker Passport Video** are affordable color target solutions compatible with Adobe Premiere, Apple Final Cut Pro, DaVinci Resolve and others. The smaller ColorChecker Passport Video is meant for travel, with four color/camera calibration targets in ruggedized pocket-sized hard cases. The focus target can be used for lens calibration, while white balance and grayscale cards, as well as a color chip chart, provide reference for color balance in post whether intercutting between two cameras or changing lighting setups. The chromatic row includes yellow, red, magenta, blue, cyan and green for an accurate range of skin tones from dark to light. The X-Rite ColorChecker Video is a combination of a color chip chart and a grayscale card with 60% white balance that has been sized for studio and location work. The grayscale provides white, black, dark gray and 40 IRE exposure patches to prevent highlight clipping while preserving shadow detail. List Price: \$149 (ColorChecker Passport Video); \$129 (ColorChecker Video). **Contact:** X-Rite, xritephoto.com.





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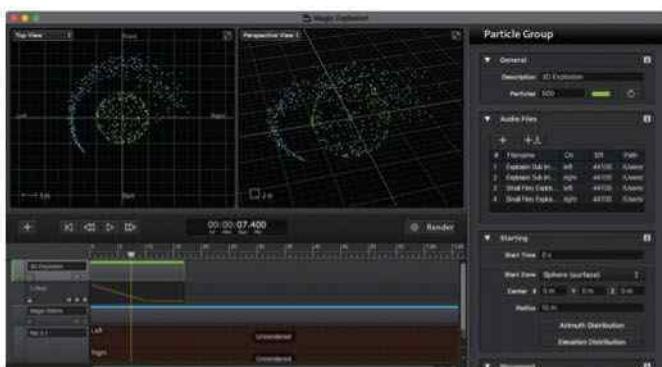
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The Mac program **Sound Particles** is a new way of looking at immersive sound design, using particle systems to create millions of sound sources over a 3D space. "Imagine a traditional CGI software like Maya or Blender, but replace the 3D objects by sound sources and replace the virtual camera by a virtual microphone," explains project creator Nuno Fonseca. "To create the sound of a battlefield, a user can pick up 100 war-related sounds from a sound library, and based on those files, create 20,000 particles (sound sources), spread over a square mile, capturing the overall sound using a 5.1 or a 9.1 virtual microphone." Through the use of movement and audio modifiers like gain, delay models, random EQ band filters or pitch-shifters, audio effects are randomized for each source. A number of virtual mics are offered: mono (omni, cardioid, hypercardioid, figure-of-eight), stereo (MS, XY, AB, Blumlein, ORTF, Decca Tree), ambisonics (up to 6th order), multichannel (5.1, 6.1, 7.1) and immersive (Dolby Atmos 9.1 bed, Auro-3D 11.1/13.1, NHK 22.2) or custom speaker formats. List Price: \$299. **Contact:** Sound Particles, sound-particles.com.



HIGH ROLLERS

The **CineBags CB40 High Roller camera bag** offers wheels and a telescoping handle for easy travel. Its customizable interior with seven padded removable dividers will fit camcorders or DSLR kits with multiple bodies and lenses, as well as accessories plus a 15-inch laptop in the bag's padded overhead compartment. Available in the traditional CineBags color scheme of charcoal/gray, as well as a newly designed Black Tactical Camo, the bag features a waterproof fabric exterior and back padding to cushion the bag from riding at your hip. The heavy-duty bags are designed for medium-sized systems with interior spacing of 21.5x11x9.5 inches, exterior dimensions of 25x15.5x10 inches and a weight of 10.3 pounds. There are three side cargo pouches and protective bottom rails, as well. List Price: \$299; \$330 (Black Tactical Camo/Limited Edition). **Contact:** CineBags Inc., cinebags.com.

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STRAIGHT UP

The **Martini storyboarding plug-in** for Adobe Premiere Pro CC on Mac and Windows easily creates replacement shots when needed materials aren't available for an edit. Designed as an easy way to create "white text on black" substitutions, Martini quickly produces composite shots through a simple interface where you can select styles like over-the-shoulder shots, two and three shots or close-ups, as well as fight scenes, chases and other pre-composed multiple-shot sequences. There are hundreds of pre-loaded interiors, exteriors and customized digital locations. In addition to new Adobe Premiere Pro support, Martini supports Adobe CS, Apple Final Cut Pro X, Avid Media Composer, and Sony Vegas Pro and Movie Studio Suite. List Price: \$200. **Contact:** MacVideo Promo, martiniquickshot.com.



iSERIES CANON CASE FROM SKB

With a custom-cut foam interior that has been sized for the diminutive, yet powerful Canon XC10 UHD camera, the **iSeries 3i-13096XC10 Canon XC10 case** from **SKB Pro AV Sales** also packs in additional room for a viewfinder, lens hood, AC power adapter, battery charger and accoutrements like batteries, memory cards and more. The waterproof case is injection-molded with an ultra-high-strength polypropylene copolymer resin shell that incorporates a gasketed and submersible design. The case is also resistant to corrosion and impact, with molded-in hinges, a trigger-release latching system and a snap-down rubber handle. Multiple cases can be stacked securely, and they also incorporate an automatic ambient pressure-equalization valve for safe air transport. List Price: \$119. **Contact:** SKB Pro AV Sales, skbcases.com.

Innovative Accessories for Production



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Rescue Me

juicedLink Little DARling
Distributed Audio Recorder,
and iZotope RX 5 Audio Editor

By Dan Brockett

JUICEDLINK LITTLE DARLING

We're looking at wireless microphone alternatives to shoot weddings and live events. Much of the time we don't have enough budget available to hire a sound mixer and we end up having to handle audio ourselves. In our experience, quality wireless systems are pretty expensive, about \$2,000 to \$3,500 for something like a single-channel Lectrosonics digital hybrid system. Short of running wired plant mics all over the location, what are some other solutions?

Michael J.
Via email

AI agree with you in regard to wireless microphone systems. I've tested and rented many wireless systems, and the quality is getting better on the lower-end tech, like the wireless RØDE RØDELink Filmmaker kit. I've also seen some price reductions on the higher-end systems as newer technology is introduced, but overall, I agree, pro-level wireless systems are expensive. An alternative to high-end wireless mics is to use isolated audio recorders on each person. The pluses are that you can record pretty decent-quality sound inexpensively with no dropouts or wireless hits. The downsides are that you're not live-monitoring the sound, so you can't adjust the sound levels. Even the smallest audio recorders generally are larger and heavier than a typical wireless transmitter pack. As the user, you'll have no idea if the battery dies, or if the talent accidentally hits the stop or pause button on the transport and the recorder stops recording.

The Little DARling Distributed Audio Recorder from juicedLink is worth your consideration. Recently introduced, these small, high-quality SD card record-



juicedLink Little DARling
Distributed Audio Recorder



ers have quite a few features that would be useful to you, like audio bracketing (aka dual-mono), 2-track recording of a single lav mic, as well as a super-long battery life, locking audio connectors, locking battery/card compartment, aluminum enclosure, durable, recessed button—talent can't accidentally stop recording or alter settings—and wireless control/slate (DARlink-enabled units). There are two models: the DAR123 basic unit (\$199 list) and the DAR124RX01 with DARlink (\$265 list), which includes the ability to wirelessly start and stop recording and initiate a slate tone that gets recorded and is also sent to the output jack. juicedLink also has created an optional wireless transmitter, compatible with the DAR124RX01, which allows you to use the wireless functions described above; it retails for \$28. juicedLink is offering a volume discount program—5% for 2 units, 10% for 3 units, 15% for 4 units, 20% for 6 units and 25% for 8+ units.

The units are brand-new, and while I haven't yet had a chance to test them, based upon previous experience with juicedLink products I've tested and reviewed alongside early user reports,

the units are well built and capable of recording very high-quality sound for a fraction of the cost of comparable wireless mic systems. You can check out the details at juicedlink.com/blogs/news.

IZOTOPE RX 5 AUDIO EDITOR

I shot a live event where I was recording a feed from the house PA system. As a backup, I placed two digital recorders at the two front podiums. The locked-off camera that was recording the house mix ended up with corrupted media that couldn't be recovered, so we have no board feed with all of the talent's wireless mic feeds. This left me with just the backup audio recordings from the digital recorders. The sound they recorded, for the most part, is decent quality, even though the recorders were placed in a less than optimal location at each podium; 85% of the event had speakers located at the front podiums and the recorders did a nice job as backups. The place where the audio needs help was when one of the speakers at the podium went into the audience with a wireless handheld mic to take audience comments. The resulting sound is awful, obviously, as the recorders were only able to record the sound from the PA speakers,

which were located a long way from the digital recorders at the podium. This is the only audio of this audience section that exists, so what's the best tool to clean up the audio to take it from awful to at least semi-legible?

Rick R.
Via email

ASometimes we end up with bad audio despite our best efforts at trying to record good audio. In your case, without hearing exactly what the problems sound like, it's difficult to tell if you can salvage at least "semi-legible" audio from it. I suggest that you check out iZotope's RX 5 Audio Editor. It's a software-based industry standard for cleaning up badly recorded audio, and RX 5 is the latest version, which features a much improved interface and some new tools for cleaning up bad audio.

There are two versions of RX 5: The Advanced Audio Editor retails for \$1,199; RX 5 Audio Editor retails for \$349. The only differences between the two are that the Advanced offers De-plosive, which can reduce plosives like a popped "P" in a track; Levele, which optimizes for dialogue with intelligent De-breath; and De-ess algorithms that automatically detect breaths and esses in a dialogue take before then applying transparent clip gain adjustments while doing the overall dialogue leveling.

I recently purchased the Audio Editor version, and I've been very impressed by the tools that came with it, and how simple and effective RX 5 is in reducing ambient noise and improving audio tracks, in general. Either version can be run as a standalone version or hosted in popular

audio-editing and video-editing programs like Pro Tools, Nuendo, Media Composer, Premiere Pro CC, Final Cut Pro X, DaVinci Resolve 12, Logic Pro X, Cubase and Sound Forge. Lack of space precludes me from giving a feature-by-feature description, but suffice it to say, iZotope RX 5 is probably the best overall, most effective noise-reduction/audio-rescue tool on the market at any price, which is why it's considered an industry standard.

You can download a trial version and try it on your audio to see if it's the right solution. Chances are, if you bring your audio to a pro sound mixer, RX 5 will be their primary tool, and while a pro sound mixer probably will have more skill at using the program than you would, it's not a complex or difficult-to-learn program, and it's well worth owning for most video editors, as well as sound professionals. It will pay for itself many times over, as badly recorded audio seems to be fairly common these days since budgets often aren't enough to hire a pro sound mixer. You can check out the features and download a trial version of RX 5 Audio Editor at izotope.com/en/products/audio-repair/rx/. HDVP

16 CFR Part 255 Disclosure: Neither juicedLink nor iZotope compensated me to write this article. juicedLink didn't send me a review unit to try out the hardware; I purchased my own copy of RX 5 Audio Editor from iZotope at full retail cost. No material connection exists between the manufacturers mentioned in the article and myself.

To have your audio questions answered, send an email to audioassist@hdvideopro.com.



iZotope RX 5 Audio Editor

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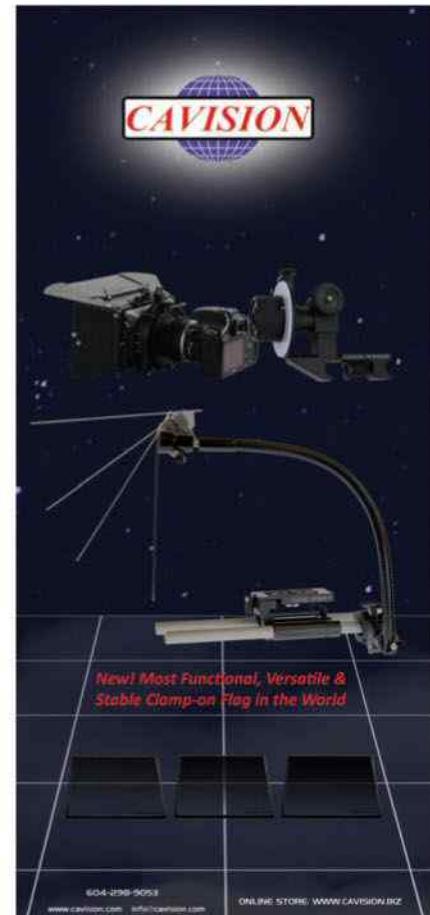
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LIGHT IT UP

SPEAKING THE LANGUAGE OF ILLUMINATION



Tools to help you
light your production
on any budget

BY DAN BROCKETT

Once you have some experience, however, you'll begin to see constants and patterns in the various locations in which you find yourself. On exteriors, you'll understand the angles of the sun and the quality of the light available during different seasons. On interiors, you'll notice how the window light hits your scene, the ceiling height and the room size—all elements that affect your ability to create powerful lighting setups.

Whether you light as a one-man band or work as a director or cinematographer alongside a huge crew, some things are a constant. Take lighting, for example. Effective lighting is both an art and a science. It takes a good eye along with ample imagination and skill—but it also takes knowledge, knowing how to put the correct tools together to help shape a compelling story.

MINDSET AND STRATEGY

When it comes to lighting any scene, there are always constraining elements in play. Like anyone thrown into an unfamiliar setting, if you're armed with inadequate gear and resources, you'll pay the price and have a difficult time creating a visual masterpiece.

One of the most important lighting tools is mindset. Always explore and educate yourself on everything regarding locations. Are you shooting interior or exterior, and at what time of day? Generally, exteriors are far more challenging to light on the fly because you have little to no control over the elements. Interiors can be simpler to light, but also require considerations that include backgrounds, the size of the room and power constraints.

CREATE A LIGHTING PLAN

Lighting plans can be an important tool in your arsenal, especially when working with a crew. It can be as simple as a few lines drawn on a cocktail napkin or as elaborate as a fully detailed lighting plan featuring the name of each instrument used, the wattage and the height, plus total amperage drawn.

I personally use OmniGraffle (omnigroup.com/omnigraffle) to create my lighting plans. It's a simple and intuitive Mac program that allows a drawing-challenged person such as myself to create sophisticated enough plans with a significant amount of detail.

GEAR CHOICES

It's 2016, and your lighting choices and grip gear have never been more flexible, more technologically advanced or, frankly, more intimidating than ever, due to the sheer amount of gear available! Remember, there's no perfect lighting technology. They each have trade-offs, making them perfect for some projects while lacking for others. The following types account for the majority of production lighting available.

TUNGSTEN

Tungsten lighting has been around since the late 1920s, immediately preceding the smoking carbon arc lights that lit scenes at the dawn of cinema. While today's tungsten lights have advanced in design and build quality, from an operational standpoint, they're the same as they were in 1927, when Mole-Richardson opened its doors in Hollywood.

One of the most popular tungsten lights ever created is the 1,000-watt 6-inch Fresnel. This light is powerful enough to be used as a key source, hair or rim, or as an accent light. The 1,000-watt Molequartz 6-inch Baby Solarspot features circular channel construction for added strength and has efficient airflow, resulting in cooler operation on set. Less heat on the fixture and a lower seal temperature from the globes also lead to longer life.

At the other end of the tungsten spectrum are relatively portable instruments such as the Mole-Richardson 6731 2,000-watt Tungsten Par. Par stands for Parabolic Aluminum Reflector, and it allows the light to have a more powerful, concentrated beam projection than would be possible with a Fresnel lens such as the 1,000-watt Molequartz—even if the Fresnel was a 2,000-watt model. Unlike traditional 2,000-watt luminaries, the 6731 Tungsten Par uses a specifically designed General Electric 2,000-watt Tungsten halogen lamp intended for axial operation. By placing the lamp on its side and using a highly polished Parabolic reflector, the Tungsten Par achieves output comparable to a standard 5,000-watt 10-inch Fresnel.

TUNGSTEN TRADE-OFFS:

Pros: High light output, with beautiful light quality. Some feel tungsten renders the most beautiful skin tones, with a very controllable, focusable beam.

Cons: Tungsten instruments are electronically inefficient and generate a tremendous amount of heat. With only about 10% of the electrical input being output as light, the remainder is heat. Using a 3200K tungsten preset white balance, many



cameras render an image with more noise than lighting set to a 5600K daylight white balance. Tungsten bulbs are delicate, so it's not a good idea to move them around when turned on.

LED FRESNEL

While LED lighting technology has been around for a few years now, the first LED lights were made of hundreds of 5mm LEDs on each panel. For those who wanted a focusable Fresnel LED light, its evolution has taken a while. ARRI recently introduced the L-Series of LED Fresnels, with an LED Fresnel fixture so close to its conventional counterpart in function and performance that it creates a previously unattainable opportunity: like-for-like replacement of traditional Fresnels with LED-based units.

Focusing on the middle of ARRI's production line, the L7-C is a 7-inch LED Fresnel lens. The light's color temperature, tint and hue can be continuously adjusted from 2800K up to 10,000K, between full plus or minus green and RGBW colors.

L7-Cs feature Light Engine 2, achieving 25% brighter light than previous versions. In addition to plus/minus green correction, other features include vibrant color selection (RGB+W color gamut), Hue and Saturation control, high color rendering, low power consumption (160W nominal), fully dimmable, true Fresnel lens light characteristics, onboard DMX In and Out, RDM implementation and USB mini connection for firmware updates.

LED FRESNEL TRADE-OFFS:

Pros: ARRI build quality, excellent brand reputation, beautiful light quality and a very controllable, focusable beam.

Cons: A relatively new technology, therefore costly when compared to ARRI's same-size tungsten counterparts. The

L-Series lights essentially have built-in computers, a technology that has yet to be proven for extreme use or rough handling.

FLUORESCENT

You've probably heard of Kino Flo, and for good reason. Kino Flo has been an innovator in fluorescent lighting for many years, with advantages over other popular lighting technologies. Fluorescents also run cool, and are flicker-free and energy-efficient.

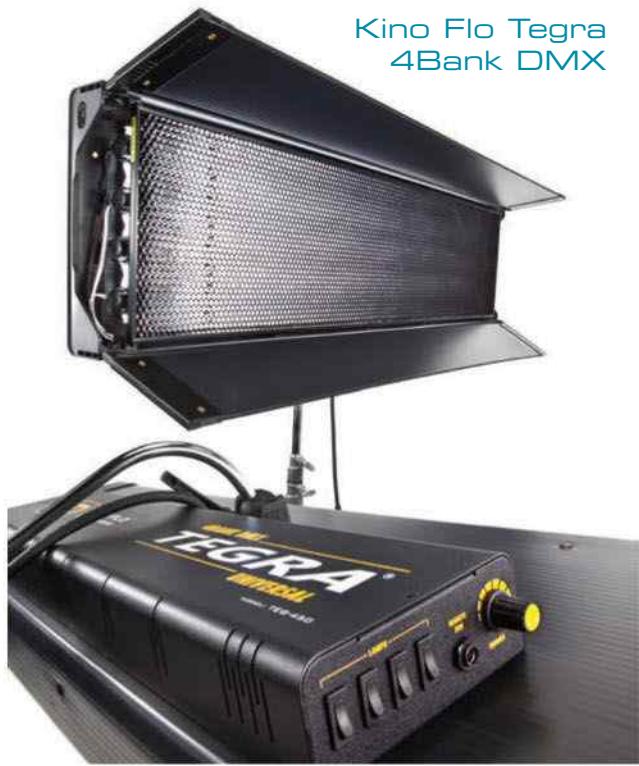
Kino Flo fluorescent lights can go from nighttime to daytime interiors by switching tungsten for daylight lamps. For travel and smaller footprints, the Kino Flo Diva-Lite 415 boasts the company's trademark modular fixture designs, with universal input voltage from 100-240VAC, full-range dimming, switching and remote-control features. The Diva-Lite 415 is also relatively light and easy to maneuver into position thanks to its rectangular design.

For productions that have more room and need more light output, the Kino Flo Tegra 4Bank DMX produces as much light as a 1000-watt tungsten softlight, using only one-third the amount of power at 2.8A (120VAC) compared to the tungsten softlight at 8.3A. Proprietary solid-state electronics operate the lamps at high output, and they're dead-quiet. The built-in barndoors with newly designed hinges, honeycomb louver and center-mount system make the lightweight Tegra ideal for handheld shots, rigging in tight locations or mounting on a light stand.

FLUORESCENT TRADE-OFFS:

Pros: Low current draw and an excellent brand reputation with unique, glowing light quality. A lightweight option for travel, they're simple to use and adjust lighting parameters, and feature a built-in dimming function.

Kino Flo Tegra
4Bank DMX



Cons: Fluorescents need to be relatively close to your subject, as too much output is lost with distance. Fluorescents are large, soft sources and effective for a soft spread of light, but there's no focusable beam, so they're ineffective for throwing a slash or light onto an object or painting a cuicoloris pattern on a background.

LED SOFTLIGHTS

De Sisti is an Italian lighting company that has been in the U.S. for decades. One of the main challenges facing LED panel users is that the light source typically emanates from hundreds of 5mm LED bulbs. Therefore, when you aim an LED panel at a subject, it's illuminated, while the shadows have a strange, unnatural look because you're essentially seeing hundreds of tiny different shadows, one from each bulb.

One way to mitigate this shadowy effect is to attach a softbox to the LED panel that softens and diffuses these hundreds of small shadows. The downside to using an LED panel through a softbox is that the softbox effectively reduces output by 20% to 30%. LED panels, as a rule, don't have high output to begin with, so reducing that even further isn't desirable.

Enter the De Sisti LED Softlight SERIES, a new range of LED softlights using Remote Phosphor technology (with a Color Rendering Index greater than 90) and an LED color-mixing chamber to produce a smooth, even, soft beam projection with very diffused shadow. The optical system eliminates any pixel effect that's created by all panel-type LEDs.

This series of LED softlights is ideal for multiple-camera setups and available with various honeycomb control screens and intensifier options for extra control. All of the electronics are integrated within the fixture and feature DC DMX dim-



Kino Flo
Diva-Lite 415

JVC

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JVC Log Mode

Emulate full tonal gamut of film with wide latitude and high dynamic range – up to 800%.

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This unique feature allows you to zoom with fixed focal lenses or extend range of zoom lenses.

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Super 35 Sensor

JVC-developed 4.5K CMOS sensor uniquely combined with an industry standard Micro Four Thirds (MFT) lens mount.

4:2:2 24-60p 50Mbps

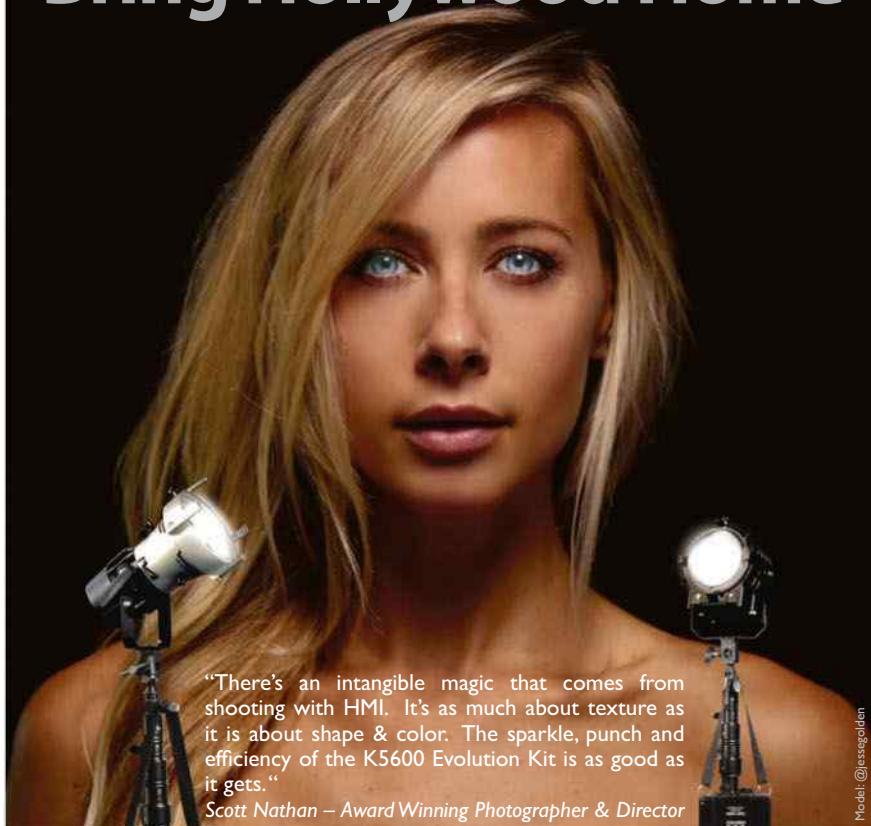
Ideal for general HD production work. 50Mbps files are stored in the Quicktime (.MOV) format for easy editing.

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De Sisti LED
Softlight SERIES

Bring Hollywood Home



"There's an intangible magic that comes from shooting with HMI. It's as much about texture as it is about shape & color. The sparkle, punch and efficiency of the K5600 Evolution Kit is as good as it gets."

Scott Nathan – Award Winning Photographer & Director

ming control from 0 to 100% with zero flicker, even with high-speed cameras.

LED SOFTLIGHTS TRADE-OFFS:

Pros: Low current draw, excellent brand reputation and mitigates the "multiple shadow" look of other LED panel lights. Lightweight, and simple to use and adjust lighting parameters, with built-in dimmers and remote DMX control.

Cons: Because this design doesn't fold or break down, these lights could be bulky for air travelers or one-man bands. These are large, soft light sources, and effective for a soft spread of light, but there's no focusable beam, so they're ineffective at throwing a slash or light onto an object or painting a culoloris pattern on a background.

HMI

K5600 makes HMI lighting for video and film. HMI stands for Hydrargyrum medium-arc iodide, and is the Osram brand name for a metal-halide gas discharge medium arc-length lamp. HMIs are a hybrid of fluorescent technology, a mix of ballasted discharge lamps and tungsten that produces a hard beam of light that's available in both PARs and Fresnels with a focusable lens.

K5600's Joker-Bug 800 fits in one tiny airline case, weighing only 38 pounds, and is relatively small and lightweight for an HMI kit. The main draw for using HMIs is that they have roughly three to four times the efficiency of tungsten lights at the same wattage and are daylight-balanced. Introduced in 1999, the Joker-Bug 800 is K5600's most popular HMI light. It produces as much light output as a 4,000-watt quartz fixture, with a power draw of only 11 amps, meaning that one

Evolution Alpha | Joker | Bi-Color

Model: @jessiegidden



K 5600
LIGHTING

www.K5600.com

circuit can power a Joker-Bug 800 and another smaller HMI, or other type of light. The Joker-Bug 800 works incredibly well as a hard source or as a source for a medium-sized Chimera or other brand softbox to become a large, daylight-balanced soft source.

HMI TRADE-OFFS:

Pros: HMIs are extremely efficient, with high output for their wattage, and are daylight-balanced. Low power consumption means a Joker-Bug 800 can be plugged into any house outlet and the circuit still has enough room to power another small light. **Cons:** HMIs are relatively expensive. They also require a separate ballast with a cable connecting the ballast to the lamp head. HMI bulbs are a consumable item; they output a high amount of UV light, so care must be taken that the light is used with its included Fresnel lenses to prevent UV exposure to talent and crew.

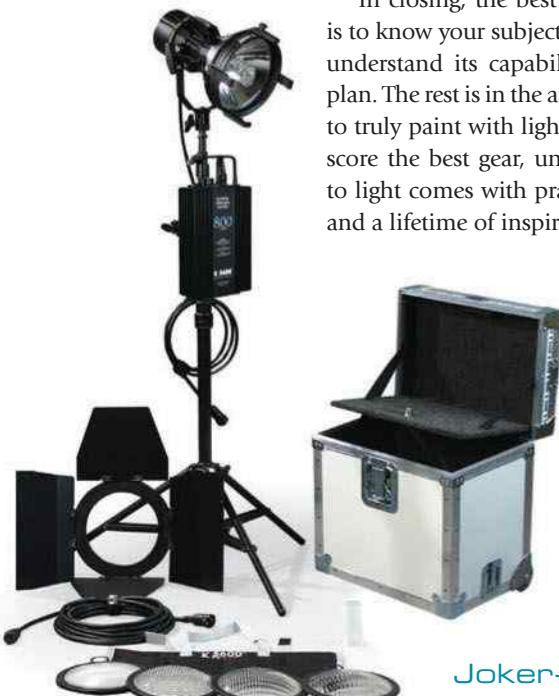
GRIP GEAR

Many professional grips, gaffers and cinematographers feel that grip equipment is just as important as the lights themselves. Grip gear is used to rig everything on set, as needed, but its primary purpose, pertaining to our discussion here, is to hold and position lights and lighting controls like flags, scrims, fingers, diffusion, nets and reflectors.

While there are numerous grip companies, three of the most popular seem to be Matthews Studio Equipment, Manfrotto and American Grip. Interestingly, all three offer a huge assortment of light stands (C-stands, flags, sandbags, dollies, etc.), but if you explore their gear, you quickly discover that each company offers items unique to their own product line.

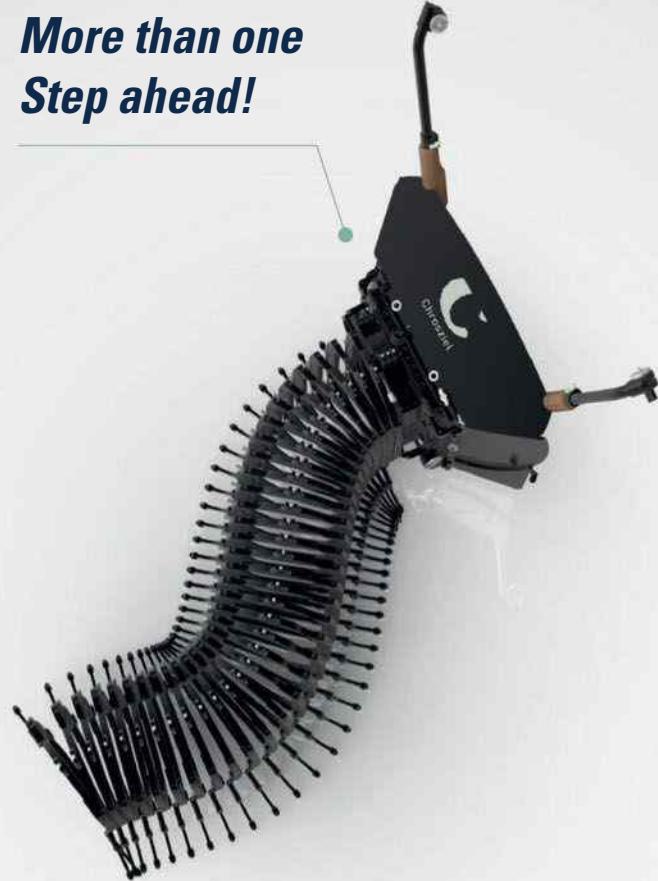
I own grip gear from all three of these companies, as well as several others, all quality stuff that functions exceptionally well. You'll also discover that if you shop for a standard item, such as a 40-inch C-stand with a grip head and 40-inch arm, the pricing between these companies is in the same neighborhood. Making your decision really comes down to trying out each brand, and then buying what feels good and works best for you.

In closing, the best plan for lighting is to know your subject, know your gear, understand its capabilities and have a plan. The rest is in the art of learning how to truly paint with light. While you may score the best gear, understanding how to light comes with practice, knowledge and a lifetime of inspiration! **HDVP**



K5600
Joker-Bug 800

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Step ahead!**



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CANON EOS C300 Mark II

BY SIMON WAKELIN



Designed with user input, this powerful update offers creative flexibility, with 4K/2K/full HD internal and external recording and a new 10-bit Canon Log 2 Gamma, for a variety of applications

Only a few months old, the Canon EOS C300 Mark II Digital Cinema Camera offers a batch of new and improved features compared to its younger brother, the C300. This is a production-grade 4K camera offering both broadcast (3840x2160) and DCI cinematic (4096x2160) resolutions, perfect for any number of professional productions.

The review unit sent to us from Canon arrived with Zacuto gear in addition to Canon's incredible CINE-SERVO 17-120mm T2.95-3.9 zoom. Breaking down some of the C300 Mark II's

most impressive features, we have the ability to capture 4K, 2K and full HD internal and external recording, which includes the option of 4K RAW output.

Early reports from rental houses reveal that the C300 Mark II is one of the most reliable 4K cameras on the market today, boasting 15 stops of dynamic range. This makes it an attractive creative tool for narrative filmmakers, as well as reality TV and documentary operators. The camera's expanded dynamic range is a remarkable feat, as is the engineering of an improved



Dual Pixel CMOS autofocus with CFast 4K recording technology.

Holding the camera, buttons on the body are easily accessible, with the added convenience of being illuminated in low-light situations. There are 17 buttons in all, each offering 15 different commands. You can easily map functions to any of these buttons through the menu.

An unfortunate flaw in the original C300 was its inferior 8-bit image quality, not on par with modern-day image expectations, as well as broadcast-quality protocols. The C300 Mark II's 4K 10-bit, 4:2:2 color space fits perfectly into those broadcast standards, however, with an ability to record 4K internally at up to 410 Mbps.

Additionally, 12-bit, 4:4:4 capture is possible at 2K or HD, settings that will enable the most color manipulation in post, if not the highest resolution. And 15 stops of dynamic range at 4:4:4 allows color graders to delve deep into the image. You also can set several different gammas (such as Rec. 709 or Rec. 2020) that will match various other camera footage, if needed.

Users had griped over the plastic feel of the older C300 model, and Canon has responded by casting a stronger metal build. Consequently, the camera feels solid and sturdy in hand, as well as being slightly larger than the original. A top handle on the camera body is also an entirely new design, but it feels flimsy and weak. This wasn't an issue, as Canon shipped the C300 Mark II with an impressive batch of Zacuto gear, including a custom helmet.

The helmet was simple to attach, effectively making a solid plane on top of the camera that replaces where the plastic handle normally sits. This enables you to attach Zacuto's own Top Handle, resulting in an easily adjustable handle that slides back and forth to get the perfect balance point when carrying the rig.

Zacuto's C300 Mark II Next Generation Recoil Rig was also impressive, easy to attach while working perfectly with Zacuto's Gratical OLED HD viewfinder, a 5.4-million-pixel-resolution EVF with a built-in -1 to +4 diopter range that was sharp to

With a die-cast magnesium body, the second-generation Canon EOS C300 Mark II offers 4K capture with 15 stops of dynamic range. Previously a 2K 8-bit camera, the C300 Mark II now processes 10-bit color space at 4K, with 12-bit color space abilities at 2K and HD resolution. An entirely new handle also has been designed by Canon, plus dual fans keep the camera cool during operation.

the eye with plenty of pop. The Recoil Rig was relatively easy to build. The camera simply slides onto its rail and is then adjustable backward or forward (depending on the weight and balance of both camera and peripheral add-ons), allowing me to perfectly balance the rig. This became important when shooting, especially with the heavy gear and big Canon CINE-SERVO zoom making the rig almost 30 pounds in weight.

This didn't feel like a negative while shooting, due to Zacuto adjustability. It's a great setup if shooting a project that forces you to work all day and carry the camera gear around with you.

Looking at frame rates, full 4K will allow for 30 fps (if you need 60 fps at 4K, take a look at Canon's EOS C500), 60 fps at 2K and HD, and 120 fps at 720p. Dual fans work to keep the camera cool while in operation. As we all know, heat management is a big concern for all manufacturers creating 4K cameras, and the C300 Mark II is no exception.

An EF or a PL mount is available for the C300 Mark II, and Canon Service will place whatever mount you desire on the camera. The 17-120mm lens worked flawlessly, but that's to be expected from a lens costing over \$30,000. Although labeled "cine," the 7x zoom has a broadcast-style servo for control of zoom, focus and iris.

Clearly, Canon's long history in ENG has paid off in the lens design, and as a result, it was a joy to use. For example, while other Canon cinema lenses offer a full 300° rotation focus, I love that this one features a 180° rotation focus range, thereby allowing for manageable handheld manual-focus shots. Macro focus is also available, something I haven't seen before on any other cinema lenses. Zoom speed on the 7x lens also can be set, with speed varying from a minimum of half a second up to a maximum of 5 minutes.

Something that still remains intact—and clearly useful—is Canon's Dual Pixel Auto Focus (DAF), a feature first available in the company's DSLR range of cameras. In essence, this means every photosite on the sensor is divided into two component cells, and at the time of focus, those cells act as a triangulation/

CANON EOS C300 Mark II

phase-detection sensor, working together to make autofocus extremely accurate. While I'm not too versed in the science here, I can report very fast focus using the Canon CINE-SERVO zoom.

Speaking of focus, the original C300 only had a small box in the center of the frame to enable autofocus. That meant you needed to aim the box at an object before locking in focus. That same box is now capable of moving around in the C300 Mark II's frame. Using either phase or subject detection also allows you to focus and follow any subject you choose, which proved effective while I was shooting.

A 2- to 10-stop ND filter switch comes in handy when, for example, larger apertures are required in bright light with low ISO. The camera's native speed is reported as ISO 800 by Canon, while sensitivity runs huge, from ISO 100 up to 102,400. Interestingly, the camera can change the sensitivity of the sensor without adding gain. This means that if you push ISO 800 two stops, you won't capture as good of an image as shooting the same scene with a setting of ISO 3200.

The ability to simultaneously record 4K with an HD proxy on an SD card is another nice touch, while different formats



Available in either PL or EF mount, the Canon CINE-SERVO 17-120mm T2.95-3.9 lens works flawlessly on the EOS C300 Mark II. Weighing 6.4 pounds, this 4K-ready lens features a high 7x zoom magnification, plus a 180° smooth-rotating focus ring.

available for use from various ports include two 3G-SDIs for 4K recording at the aforementioned 410 Mbps.

A brief explanation of Canon Log 2 (C-Log2) is warranted here. It should be considered, even if you're unfamiliar with using it. C-Log2 gives the benefit of capturing all of the sensor's dynamic range. For example, if you record in Rec. 709, the dynamic range available to you means you'll need to protect your highlights, whereas shooting in C-Log2, you actually extend into those highlights when your footage is

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The EOS C300 Mark II was delivered with Zacuto gear, which helped to perfectly balance the camera body and heavy lens and create a comfortable shooting package on the shoulder. The camera's higher-quality 4K image, along with improved ergonomics, makes it an ideal choice for ENG or reality TV-based work.



graded, so you capture far more depth. Slight overexposure is also recommended; the extended range available means the image is easier to pull down.

As for power and audio, a new 14.4-volt battery provides ample juice for a power-hungry camera, and audio is available in two channels, either 16- or 22-bit quality.

In closing, the feel of this new camera, its balance on the shoulder and in the hand with the Zacuto gear and viewfinder, paired with the upgraded functions available, make the second-

generation EOS C300 a worthy 4K camera with exceptional dynamic range. With so many positive comments from rental houses expressing their customers' love of the camera, it seems clear that you can't go wrong using the EOS C300 Mark II. Word of mouth is the real reveal on any camera dynamic, and so far it seems Canon's latest 4K offering is a winner. List Price: \$15,999 (body only).

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Learn more about the Canon EOS C300 Mark II at usa.canon.com.

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Leica SL

The Leica SL-System is a sign of things to come from Leica AG—and perhaps the future of the DSLR form factor

BY JIMMY MATLOSZ



The Leica SL-System taps into many production possibilities all at the same time, and once it's in your hands, you're torn on how you want to use it. While my intent was to fully review and test the camera's video capabilities, I couldn't resist what the SL offers in the stills format. Considering that Leica is a relative newcomer to the DSLR camera (with a video capture option), there's a lot of curiosity as to what creative options it will bring to a production. And this is where the SL is revolutionary in the marketplace—it's a mirrorless digital camera, and it's the first professional camera to feature an electronic viewfinder that looks and performs like a DSLR.

But let's start with video. The SL offers a 4K option (4096x2160, with stills at 6000x4000), capturing in MP4 and MOV (8-bit H.264 HD 1-1-1), in addition to a Gamma Log mode option. The MP4 and MOV settings can be found in the standard video menu, while the Gamma Log mode is in the Menu settings under Image.

Leica has made good use of the HDMI 1.4 protocol output, allowing for 4K 10-bit uncompressed transmission to an external recorder. Frame rates vary and are relative to different resolution options: 4K (4096x2160) at 24 fps; 4K (3840x2160) at 25 and 30 fps; 1080 at 24, 25, 30, 50, 60, 100 and 120 fps; and





A unique entry from Leica, the SL is the company's best low-light camera, to date, offering 4K DCI (4096x2160) capture at 24 fps and 4K UHD (3840x2160) at 25 and 30 fps in a 10-bit, 4:2:2 color space. In full-frame mode, the SL also can shoot full HD video at up to 120 fps. With its minimalist design, incredible EVF and easy interface that clearly separates camera and video settings, the SL will attract wedding pros and studio photographers, as well as filmmakers seeking a camera with great feel and potential.

720 at 24, 25, 30, 50, 60, 100 and 120 fps. (Of note, the 4K is approximately a Super35-sized window, pixel for pixel, while the 1080 is full sensor width subsampled.)

The body of the SL has a great feel. Its physical design is well balanced and has the right amount of weight (1.87 pounds with battery, 4.6 pounds with lens). While some may consider a heavier camera to be an issue, in my experience, this adds considerable stability and dampens tiny movements from the breathing, pulse and heartbeat of an operator. A heavier body also offers resistance, smoothing out the simplest and most complex of moves.

The SL is a true professional camera that feels more like a well-tuned machine. I honestly felt the weight distribution was near-perfect and a real asset. The body with lens attached is water-resistant. Rumors of a Singapore presentation where product managers poured a bottle of water over the body can be found on the Internet. In other words, "Don't try this at home," but it's good to know.

The EyeRes viewfinder is very bright and crisp, plus easy and

natural on the eyes. It's the first of its kind at 4.4 million pixels, with an imperceptible latency factor (reported at 60 fps refresh). Leica not only has taken mirrorless still photography to a new high, but also has advanced the concept of the mirror becoming extinct. The viewfinder offers various display information set by the user; all the information that matters is close at hand—ASA, shutter, f-stop and color temperature, as well as a histogram to monitor exposure. Dual-axis grids for leveling and focus peaking are available, as well.

The display on the back of the camera also offers Live View. A nice touch by Leica is the addition of a motion-sensor option that detects your eye moving to and from the viewfinder, thereby automatically switching from display to viewfinder by the placement of your eye.

The only stock lens currently available for the SL is a Leica 24-90mm F2.8-4. It's a beautiful, but hefty piece of glass that balances perfectly with the camera. It feels like the lens was designed to be a true extension of the body. Leica is offering a variety of

adapters to use legacy lenses and modern Cine lenses with a PL mount. In total, there are a remarkable 120 potential Leica lens combinations available between Leica's M, S, R and Cine lenses.

The body comes with two standard SD card slots. Interestingly, they work at different speeds: card slot one is rated at UHS-II while slot two is rated at UHS-I. I experienced and read of no issue recording video or stills to either card slot, which can be chosen by the user.

One thing to note here: Be sure the cards you use are of a compatible speed for both video and stills. A slower card was inserted in my first test that I normally use for audio recording, but the camera gave a warning that it was too slow. However, I still managed to record plenty of shots on video. It stored the footage in its buffer before slowly transferring it over, which was a serendipitous discovery!

Once set up, the SL was easy to use. Like any camera, there are different buttons in different places for varying functions. As a result, there's a learning curve, but in a short time it all made sense.

The feel of the camera while shooting was solid, and upon reviewing motion footage—quickly accessible on the rear screen with one of four buttons that bookend the rear screen—I did notice image smoothness. I attribute this smoothness to the camera's heavier body, but also realize there's image stabilization built into the 24-90mm zoom.

I found that using the EVF was better than shooting off the rear screen. There was a noticeable comfort with the eye fixed to the eyepiece, but it's also the combination of weight and design that makes it feel like more of a hybrid digital cinema camera.

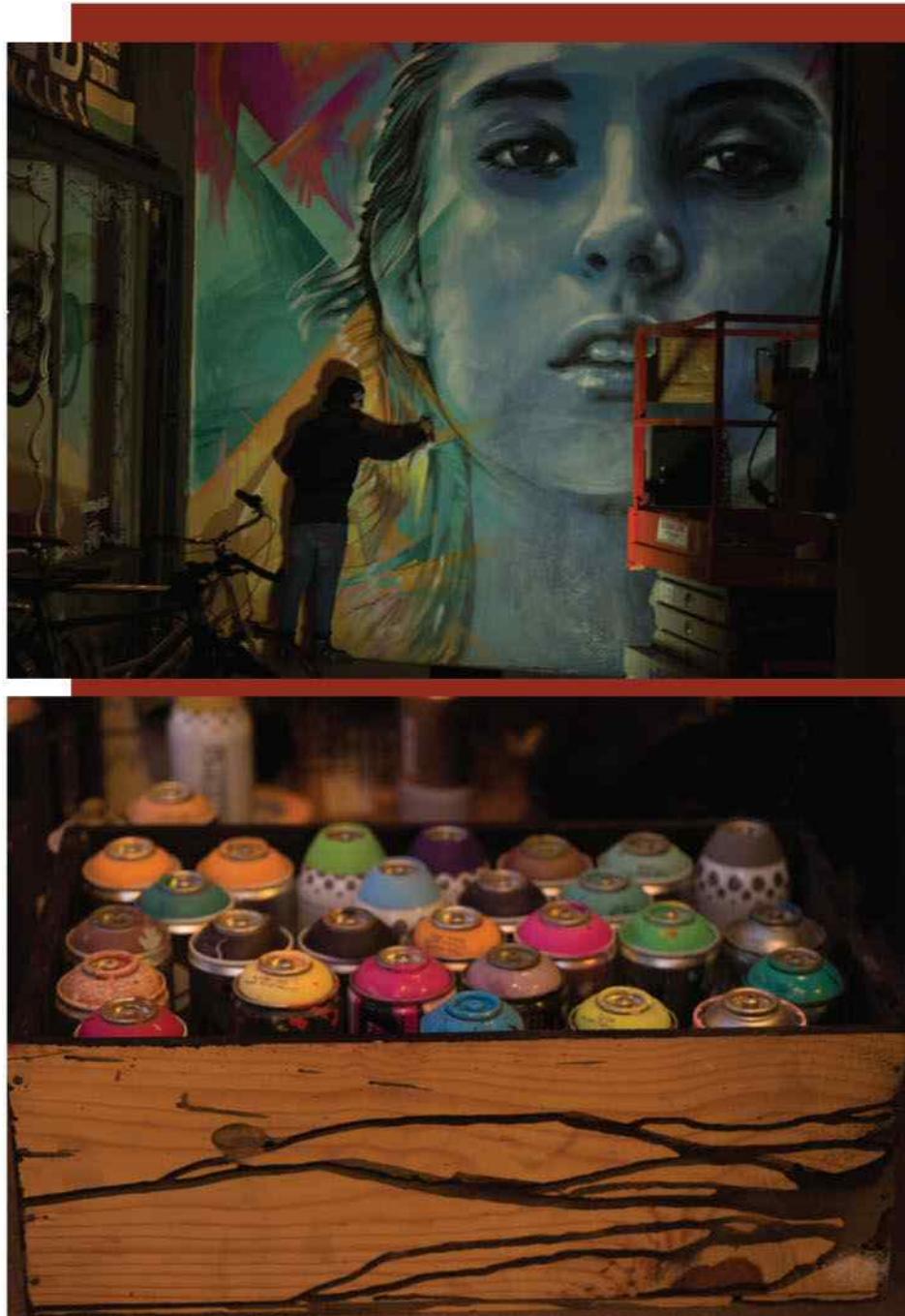
For downloading, I used an external card reader. The H.264 footage dropped nicely into Adobe Premiere, where I experimented with simple push and pull in grading to check latitude and flexibility. I found that the image had a nice roll-off into overexposure and the black levels seemed satisfactory for the medium.

While testing the video, I couldn't help but test the stills application—after all, this is Leica! Operation proved to be very simple. Leica offers JPEG (8-bit) and DNG (14-bit) options—or both at once. The files are huge. For one still at full resolution, a DNG image is 43.5 MB, while its JPEG counterpart comes in at 12.5 MB. The image quality is stunning and was a real pleasure to work with.

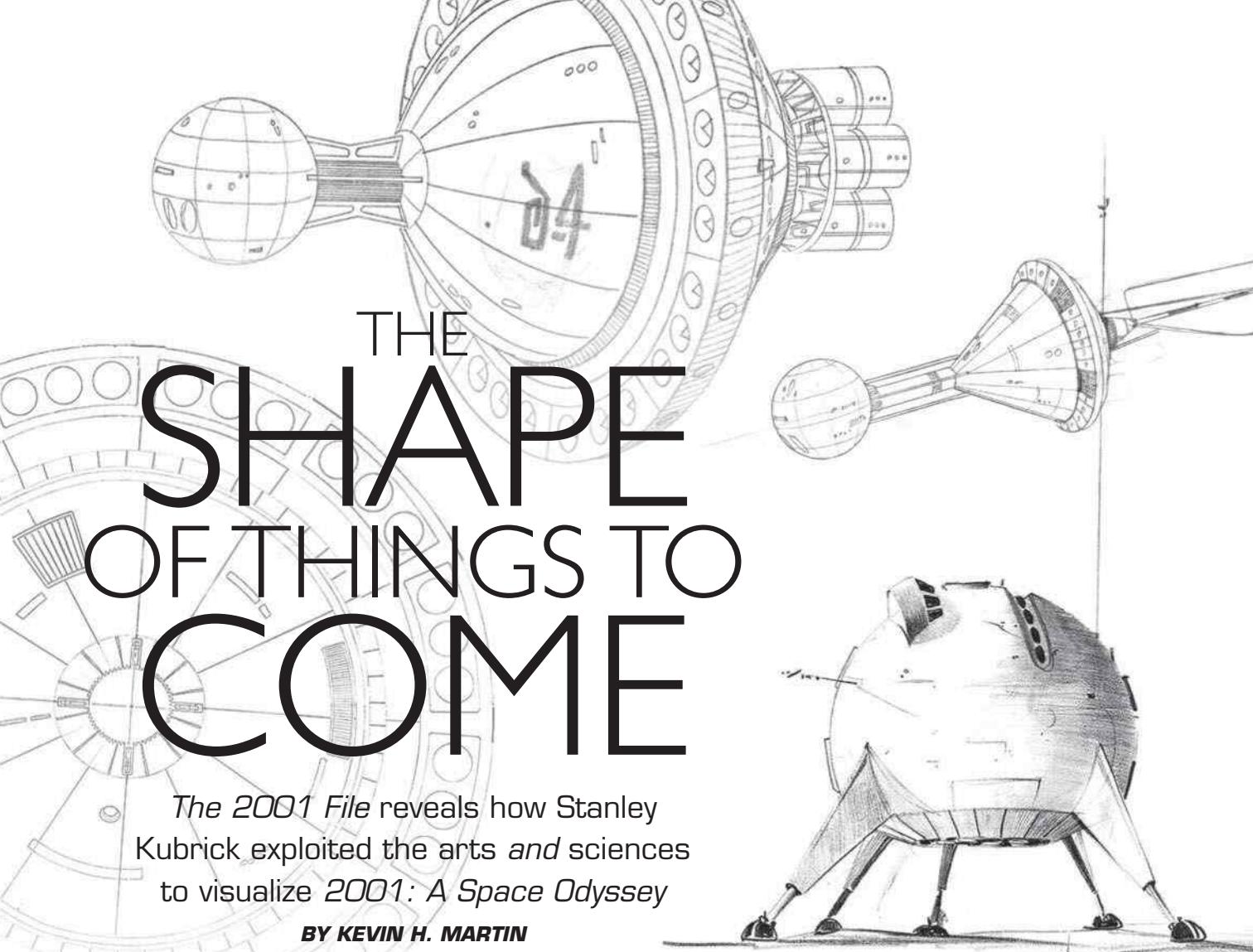
The Leica SL is a "real" full-frame stills camera; the sensor measures 36x24mm, the exact same size as the sensor on a

traditional film camera. As with any new camera, there's excitement and criticism. The Leica SL is fun when considering the possibilities of both video and stills. Knowing you have a superior product in hand makes you push the boundaries and be a little more fearless. As a result, I felt as though I had only begun to scratch the surface of this beautiful new offering from Leica, as the only limit was time! List Price: \$7,450 (Leica SL); \$4,950 (Leica 24-90mm F2.8-4). HDVP

Learn more about the Leica SL-System at us.leica-camera.com.



World-renowned local artists DJ Neff (neffink.com) and Christina Angelina (christinaangelina.com) collaborated on a mural on Venice Boulevard in Mar Vista, California. The pair worked on the piece day and night over two days, creating a wonderful palette and subject for testing the Leica SL-System.



THE SHAPE OF THINGS TO COME

The 2001 File reveals how Stanley Kubrick exploited the arts and sciences to visualize *2001: A Space Odyssey*

BY KEVIN H. MARTIN

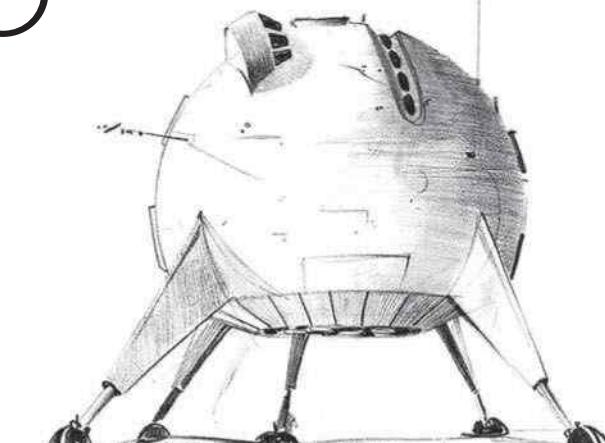
Sir Christopher Frayling's extensive illustrated volume, *The 2001 File: Harry Lange and the Design of the Landmark Science Fiction Film* (Reel Art Press, 2015), documents the design evolution for all manner of vessel and future construct in Stanley Kubrick's groundbreaking space film *2001: A Space Odyssey*. Frayling, author of *Ken Adam Designs the Movies: James Bond and Beyond* and *Sergio Leone: Something to Do with Death*, begins his book by detailing Adam's brief involvement at the start of the project (the designer later would spend a short stretch involved in an unsuccessful attempt by Phil Kaufman to make the first *Star Trek* feature). Adam had previously created *Dr. Strangelove's* startling, yet iconic war room for Kubrick, and seemed a natural choice to tackle the director's new film. Commitments to Agent 007, however, plus the unavailability of any script, quickly made his involvement impossible.

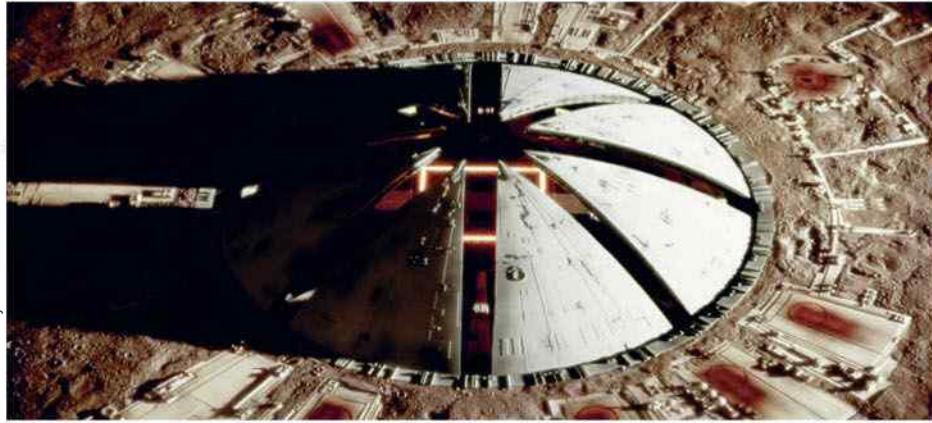
It was Tony Masters (and later Ernest Archer) who was hired as art director on the film, until Kubrick's interest in the realities of spaceflight led to Harry Lange, who became the film's third art director. Lange and Frederick Ordway, the film's chief scientific advisor, became involved through association with novelist/scenarist Arthur C. Clarke, Kubrick's writing partner on the film, and the collective became largely responsible for the technological veracity of designs that feature so prominently throughout the film.

The first section of *The 2001 File* recounts the film's production, a fascinating history with input from sources new and old. Excerpts from Clarke's little-known *The Lost Worlds of 2001* provide a timeline for the lengthy production—writing began in 1964, production wrapped by the end of 1965, and the film debuted in 1968. Interviews with Lange, Ordway and model builder David Watkins also provide new data on processes employed to fabricate various spacecraft, all while maintaining Kubrick's notoriously exacting standards.

A few legends surrounding the film are also laid to rest, such as why the HAL 9000 computer's acronym-moniker happens to be exactly one letter ahead of IBM—just one of many films making major contributions for the sake of early product placement. Indeed, Lange aided in dealings with various organizations that included Boeing, General Electric and Honeywell.

Others books chronicling the making of *2001* have focused on specific elements: either the writing, the logistics of production or the years spent devising and implementing visual effects that rarely have been rivaled. What differentiates this book from the rest is "The Harry Lange Archive," consisting of artwork—most of which has never been seen—that makes up the bulk of its 336 pages. Lange's work is divided into dedicated sections about his pre-film art, *2001*'s near-Earth sequences and lunar





OPPOSITE AND TOP: Early "Bell"- or "Saucer"-shaped concepts of *Discovery*. Early concepts for lunar carrier vehicles, with handwritten annotations by Stanley Kubrick—and second thoughts about Aries-1B. CLOCKWISE FROM ABOVE, LEFT: Clavius Moon Base, white-on-black art. Early model shot of the "pyramid" monolith in a lunar trench. Never-before-seen photo of the moon base.

sequences, and, finally, aboard *Discovery One* en route to Jupiter.

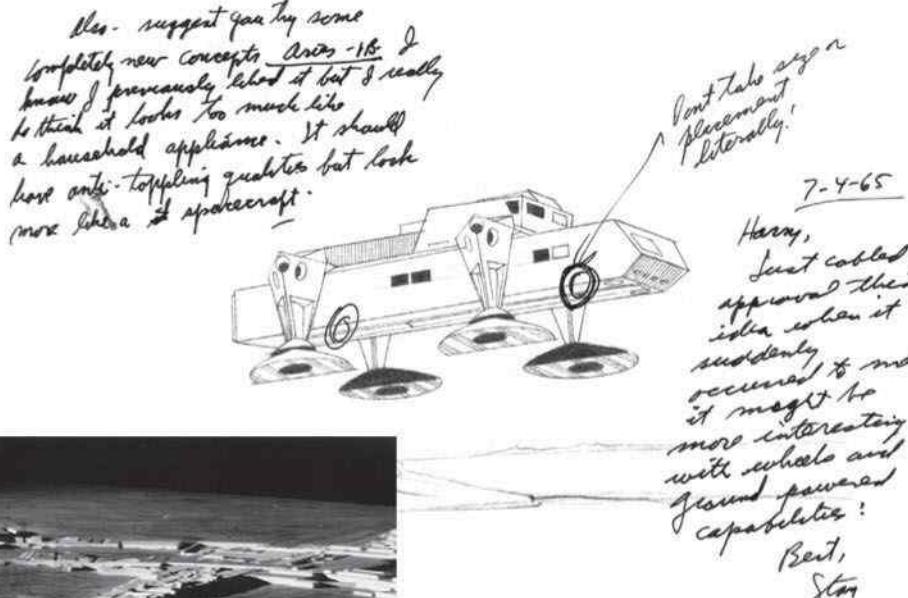
Interestingly, Lange's designs for *Discovery One* reveal an initial squat-tier-shaped spaceship before expanding its proportions for widescreen capture (conceptual artist Syd Mead went through a similar design evolution two decades later on *Aliens* when illustrating Sulaco, that film's hero vessel). This lengthier redesign also incorporated genuine science-in-space principles, justifying the need to keep crewmembers well isolated from potential drive-system dangers located astern.

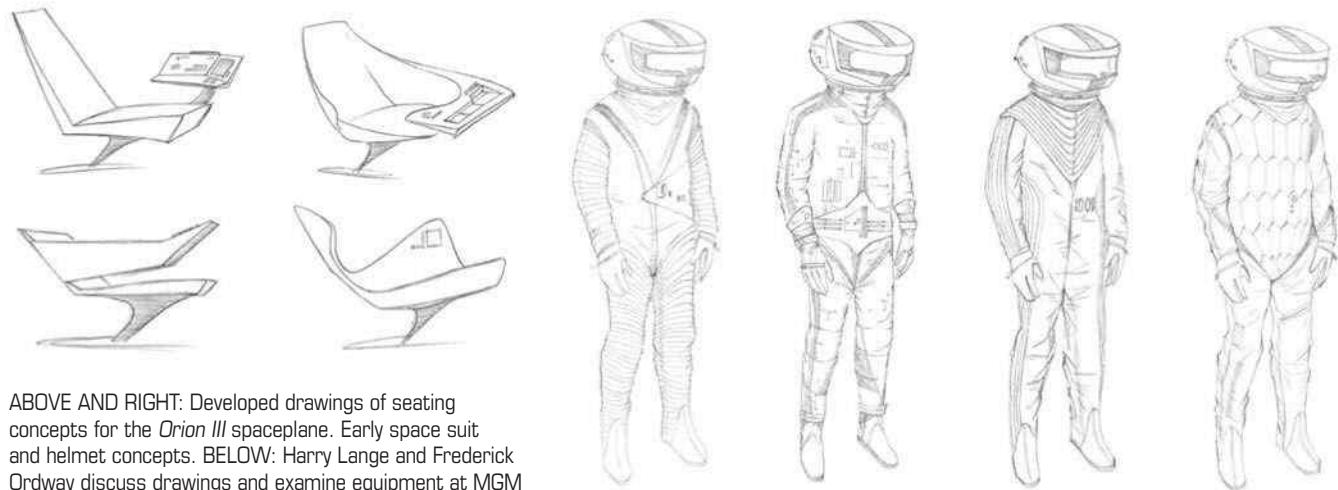
The book flows with simple designs before revealing increasingly more elaborate renderings, work depicting how astronauts would move between various interiors—artwork including the hamster-wheel-style centrifuge set and ship's pod bay, plus numerous unused illustrations of chairs that might plausibly be used in spaceflight,

some of which still look striking today. These extensive designs suggest a progression retaining a NASA/near-future extrapolation while staying in sync with Kubrick's cinematic vision.

Many of these illustrations, ranging from thumbnails to full-blown color artwork, feature annotations in Kubrick's own hand that reveal the director's monumental attention to detail and technical accuracy. Similarly, decades later, Steven Spielberg chose to conform *Jurassic Park*'s dinosaurs to established behavioral patterns as determined by paleontologists, perhaps inspired by Lange and Kubrick's commitment to verisimilitude.

The 2001 File also reveals a number of intriguing facts, such as Lange trying his hand at different looks for the alien monolith before Kubrick chose to go with the plain black slab. But the designer's talent clearly lies in extrapolating the possible, then





ABOVE AND RIGHT: Developed drawings of seating concepts for the *Orion III* spaceplane. Early space suit and helmet concepts. BELOW: Harry Lange and Frederick Ordway discuss drawings and examine equipment at MGM Borehamwood, during preproduction of *2001*.



Courtesy of Reel Art Press

turning that extrapolation into a scientifically credible—and cinematically workable—concept for Kubrick.

Lamentably, a plan to put the film's models on display in Washington, D.C.—even, apparently, the 50-foot-plus designed *Discovery*—was cancelled by Kubrick after lengthy preparations by Ordway. As a result, nearly all miniatures wound up being lost or discarded. Remains of the 8-foot space station were photographed in a field years later and, miraculously, a near-intact Aries-1B model also turned up in a garage.

Clearly, Lange's work helped *2001* achieve a credibility level that has stood up in cinematic history for half a century. It also served as a point of departure for many who followed in Kubrick's wake.

Doug Trumbull, one of the film's VFX supervisors, made his directorial debut with *Silent Running*, and admitted his film was a conscious reaction to *2001*'s packaged look. George Lucas used the *2001* interiors as a kind of jumping-off point for

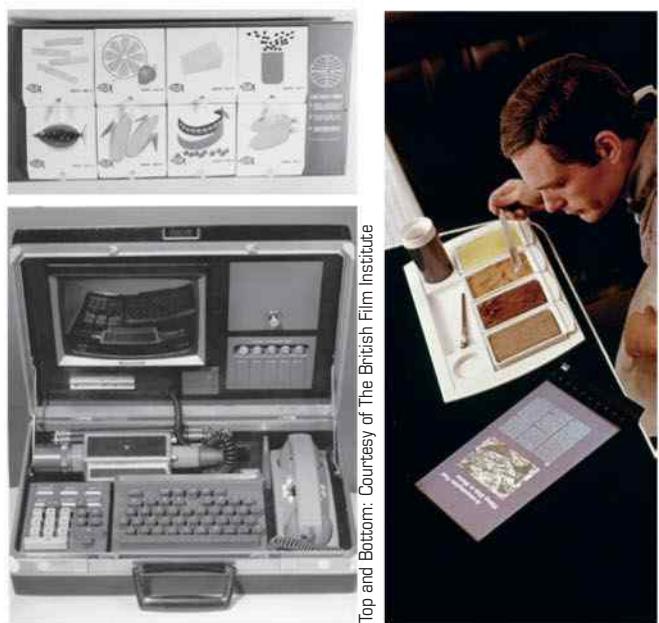
Star Wars. It was as if his ships were the same vessels, seen again after centuries of wear and tear. The film emerged as a kind of synthesis of *Silent Running* and *2001*, as did Ridley Scott's *Alien* (for which Ordway declined involvement; by way of contrast, Lange remained active in the film industry, most notably with *The Empire Strikes Back* after aiding Ken Adam with his final Bond film *Moonraker*).

With a hefty \$75 price tag, *The 2001 File* shouldn't be dismissed as mere pages for Kubrick aficionados. This is a comprehensive book unveiling extensive designs behind one of the most influential films in cinematic history, detailed analysis that will serve to impact filmmakers for generations to come.

Meanwhile, with new versions of *Star Trek*, *Lost in Space* and *Galaxy Quest* in development, it may not prove surprising to spot some variations on Lange's snazzy unused chair designs turn up on screens in the not-too-distant future.

HDVP

Visit the Reel Art Press website at reelartpress.com.



Top and Bottom: Courtesy of The British Film Institute

Photo by John Jay/mptvimages.com

ABOVE: Pictorial in-flight food box from Seabrook Farms. The attaché case computer designed with Honeywell. Bowman (Keir Dullea) eats a meal while watching his Newspad aboard *Discovery*.



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Sundance

2016

BY SIMON WAKELIN

The Sundance Film Festival welcomed the world to Utah once again, continuing its mission to introduce us to a diverse mix of highly entertaining and culturally significant work from around the globe



While films continually flickered on screens around Park City, the movie market set to work, but acquisitions seemed to be a mixed bag this year. While huge bids were made on quality material—among them, Fox Searchlight's record-breaking deal of \$17.5 million for director Nate Parker's Grand Jury Prize- and Audience Award-winning *The Birth of a Nation* and Amazon Studios' \$10 million bid for *Manchester by the Sea*, directed by Kenneth Lonergan—there was mediocre fare often seeking too much money for rights. As a result, the festival wrapped with a number of films still up for grabs, but they may find sales soon with the endless avenues of distribution available these days. The ever-expanding VOD model tops the list, often pushing theatrical releases out while simultaneous launching across home entertainment platforms. Case in point is Netflix, who infamously released *Beasts of No Nation* in theaters last year while streaming to couch potatoes on the very same day of its release.

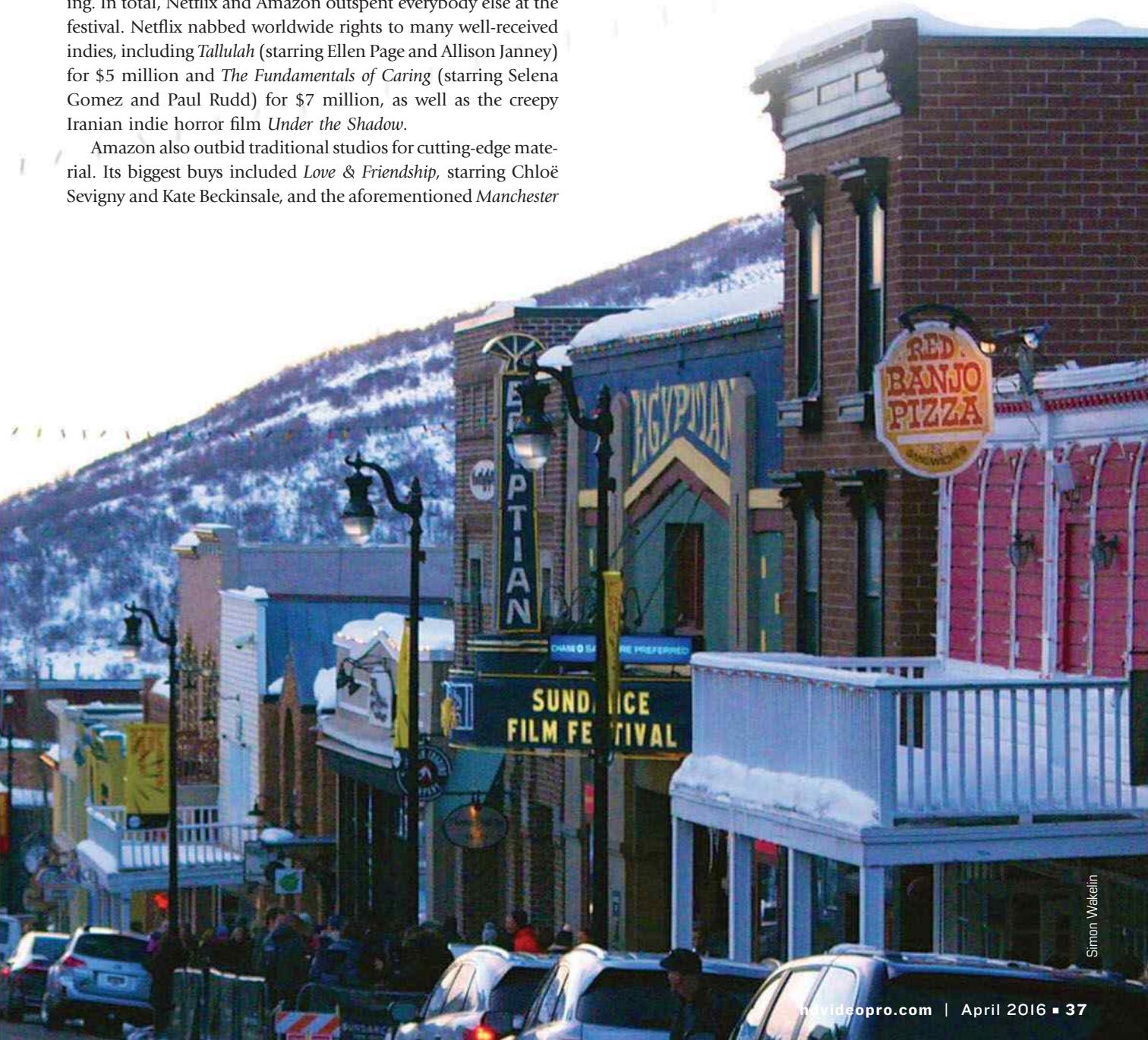
Indeed, Sundance 2016 will go down as the year of streaming. In total, Netflix and Amazon outspent everybody else at the festival. Netflix nabbed worldwide rights to many well-received indies, including *Tallulah* (starring Ellen Page and Allison Janney) for \$5 million and *The Fundamentals of Caring* (starring Selena Gomez and Paul Rudd) for \$7 million, as well as the creepy Iranian indie horror film *Under the Shadow*.

Amazon also outbid traditional studios for cutting-edge material. Its biggest buys included *Love & Friendship*, starring Chloë Sevigny and Kate Beckinsale, and the aforementioned *Manchester*

by the Sea, starring Casey Affleck and Michelle Williams, neatly coming out on top over a trifecta of big guns in Fox Searchlight, Focus Features and Universal Studios. Other films in Amazon's stable included *Complete Unknown*, *Gleason* and *Wiener-Dog*.

Streaming remains the radical antagonist to the studio megaplex mindset, but old-school dynamics still persevered. While Netflix bid an astonishing \$20 million for the rights to *The Birth of a Nation*, it was Fox Searchlight who walked away with the biggest film of the event for almost \$3 million less, due no doubt to the studio's prestige and plausible Oscar® buzz machine once the film is released nationwide.

While deals were afoot, features continued to screen, with a number of highly entertaining entries across many categories. Here are some films that were signature Sundance entries, work of consequence beyond the glitz and glamour of high-profile acquisitions.



Simon Wakefield

This Special Jury Award-winning film was recognized for its unique vision and design, and deservedly so. A 1980s-set musical horror film, *The Lure* was a bizarre, yet riveting feature. Sundance is renowned for screening films that push the boundaries of filmmaking, and *The Lure* was no exception. A Polish entry in the World Drama section, it will warm the hearts of David Lynch fans—which, is to say, it will disturb, offend and probably mystify the average filmgoer.

In essence, *The Lure* is a trippy allegory for teenage sexuality. It begins on a dark night at the water's edge when a family of musicians spots two mermaids close to shore. After singing an enticing

melody, the stunning aquatic creatures are helped ashore and quickly recruited to join the band at a neon-lit dance club in Warsaw.

When one of the mermaids, Silver, falls in love with the bassist, the more cunning sister, Golden, goes out to hunt for food, unable to assimilate with mankind and escape her bloodthirsty nature while worrying that her sister's relationship will doom their shared dream of swimming to a new life in America.

This Euro-pop flick wittily plays with lust and repulsion in compelling ways, as the bewitched sisters and their glittering long tails lead us through an absurd, yet thoroughly intriguing film full of dark shadows and dripping blood.

The Lure



Photos courtesy of Sundance Institute



Photos courtesy of Sundance Institute

A powerful, emotional journey that rides a razor-sharp edge between offensive and evocative, *Wild* is the third film directed (and written) by German actress Nicolette Krebitz, the story of a rebellious woman who turns away from her mundane existence to embrace the endangerment of the wild.

The story begins when Ania (Lilith Stangenberg) is startled by a lone wolf staring back at her from the edge of the woodlands close to her home. The encounter awakens something deep inside, driving her to purchase raw steak, left in the woods, in an attempt to befriend the beast.

The encounter soon becomes an obsession, a catalyst that leads

to Ania's tranquilizing and leashing the wolf before bringing it back to her high-rise apartment. This is where the film begins to examine the boundaries of what's considered acceptable and watchable on film, with a series of intense scenes that will offend some and fascinate others. It's an incredibly powerful performance from Stangenberg, whose presence on screen is undeniable, laying everything on the line, as cinematographer Reinhold Vorschneider frames her beautifully throughout.

Wild is a look at our instincts deep within, taken to the extreme on screen. Bravo for the powerful, provocative filmmaking that ultimately may have gone too far.

Wild

White Girl



Courtesy of Sundance Institute

This is an unflinchingly real portrait of drug use based on the experiences of the film's director, Elizabeth Wood. An entry in the U.S. Dramatic Competition, *White Girl* is the story of Leah, a college student who goes to extremes to get her drug dealer boyfriend out of jail. The film unveils a drug world of radical debauchery, as Morgan Saylor (*Homeland*) bravely plays Leah, who quickly falls down the rabbit hole into a dark world of heavy drug use and deceit.

The title of the film doesn't refer to its beautiful blonde-haired, blue-eyed lead, but rather to the kilo of cocaine left behind by Leah's boyfriend Blue (played with conviction by Brian "Sene" Marc) after he's arrested dealing drugs on the streets.

Although hedonistic and raunchy, the constant drug use on screen quickly numbs the mind, while hyper-realistic film-

making underlines the inherent dangers of living a lifestyle of excess, especially apparent when the film's lead snorts and screws her way out of trouble. The depravity of Leah's situation becomes full-blown once Blue is arrested, and she goes on to make incredibly foolish choices with a kilo of coke in hand, snorting and selling her stash with no care for the repercussions of her ways.

White Girl plays as privileged youth run rampant in New York City, the story of a well-to-do girl who rapidly becomes the victim of her own self-wreckage. It's a powerful portrait of someone too preoccupied with her own wild abandon to calculate the consequences of her rebellious ways. If this is a vicarious expression of Wood's own experiences, it's a bitter, yet powerful pill to swallow.

Photos courtesy of Sundance Institute



Already purchased by Lionsgate before screening, *Operation Avalanche* attracted a big audience. Writer-director Matthew Johnson also created *The Dirties*, a Slamdance Film Festival winner in 2013.

Operation Avalanche plays with intrigue in fascinating ways, a found footage film from 1967 featuring four undercover CIA agents sent to NASA posing as a documentary film crew to investigate the possible existence of a Russian mole. They successfully tap phones and break into offices while interviewing scientists, but when they end up uncovering a shocking NASA secret, they decide to embark on a new mission that puts their own lives at risk. One of the

biggest conspiracies in American history begins to unfold on screen, as the CIA agents fake the moon landing during the Cold War in order to beat the Russians to the punch.

A large part of the film's realistic '60s feel was achieved by using old '50s Angénieux lenses on Blackmagic Pocket Cinema Cameras, with much of the footage shot covertly at NASA and Shepperton Studios in London. Shooting in RAW, footage was converted into a 2K scan from the Pocket Cinema Camera's Super 16mm chip, then graded after the final 16mm conversion. The result is a compelling film that grants us immediate access to an era gone by.

Operation Avalanche



Courtesy of Sundance Institute

It's A Wrap

An ever-expanding slate of films encompassed Sundance 2016, indicative of the festival's continued efforts to embrace an evolving cultural landscape of filmmakers from all over the world. Sundance also expanded the art of storytelling in new and exciting ways, especially prevalent in its experimental New Frontier exhibition. Celebrating its 10th anniversary, New Frontier featured 30-plus reality-shattering virtual-reality installations in various venues, compelling stories told in a powerful emerging medium.

Meanwhile, documentary premieres featured a host of intriguing profiles, including Frank Zappa, Robert Mapplethorpe, Maya Angelou, Michael Jackson, Norman Lear and O.J. Simpson. The U.S. Documentary Grand Jury Prize went to *Weiner*, a political pic about disgraced former U.S. Representative Anthony Weiner.

Various special events also offered one-of-a-kind insights into the creation of new independent works at Sundance, while Slamdance was abuzz with its own collection of visionary filmmakers. That event, in venues nestled at the end of Main Street, was established by spirited filmmakers after their works were rejected by Sundance. In response, they formed their own festival, which turned 20 this year, and has only grown to enhance the cinematic experience for Sundance festivalgoers in Park City.

HDVP



Simon Wakelin



Simon Wakelin

Sundance 2016 included a variety of virtual-reality experiences, as well as various panels such as the Adobe-sponsored "Editing Insights from *Hail, Caesar!* and *Deadpool*," which featured *Deadpool* director Tim Miller and *Hail, Caesar!* editor Katie McQuerrey.

Visit the Sundance Film Festival website at sundance.org.

MOODY BLUES

Stefan Czapsky, ASC, reveals his fresh approach to capturing cinematic visuals on NBC's latest hit, *Shades of Blue*

BY IAIN BLAIR

***Shades of Blue*, the new NBC police series starring**

Jennifer Lopez, starts with a bang. Lopez plays Harlee Santos, a single mother and resourceful, but compromised detective at the heart of a tight-knit crew of Brooklyn detectives. Led by enigmatic Lt. Matt Wozniak (Ray Liotta), Santos is looking far from glamorous while confessing to all manner of shady dealings after being busted by the FBI. As the tired, bruised Santos starts to sing, we flashback to the twisty course of events that have landed her in trouble.

That's the setup of *Shades of Blue*, a cinematically inspired story following Santos as she's wired and pitted against her very

own unit. As newly turned informant, she struggles to safeguard herself and avoid arrest while engaging in a perilous dance with her FBI handler, Special Agent Stahl (Warren Kole). Stahl soon develops an unhealthy obsession with her, as Wozniak, acting as the unit's patriarch, begins an all-consuming hunt for the unidentified informant. A top-notch cast includes Drea de Matteo (*The Sopranos*, *Sons of Anarchy*), Dayo Okeniyi (*Terminator Genisys*, *The Hunger Games*), Vincent Laresca (*The Aviator*, *The Fast and the Furious: Tokyo Drift*), Hampton Fluker (*Aquarius*, *The Blind Side*) and Sarah Jeffery (*Rogue*, *Wayward Pines*).

The show also boasts heavyweight talent in executive producer



Peter Kramer/NBC

Jeff Riedel/NBC

Peter Kramer/NBC



Virginia Sherwood/NBC

Barry Levinson (*Rain Man*, *And Justice for All*), who also directed the pilot and first episode, series creator and writer Adi Hasak (*Generation Kill*, *3 Days to Kill*), and EPs Elaine Goldsmith-Thomas, Benny Medina, Ryan Seacrest and Nina Wass (and Lopez).

If TV is the new cinema, then the show's polished and ambitious look goes to both Levinson and director of photography Stefan Czapsky, ASC. Czapsky is widely recognized for his work crafting iconic films such as *Edward Scissorhands*, *Batman Returns*, *Blades of Glory* and *Ed Wood*.

Coincidentally, for one of his first projects as a DP, Czapsky shot another cop story with "Blue" in the title, director Errol Morris' acclaimed 1988 documentary *The Thin Blue Line*. He subsequently shot on inventive cult pictures including *Vampire's Kiss* and *Last Exit to Brooklyn*.

Shades of Blue marks Czapsky's first foray into episodic TV. "When Barry hired me, he expressed a desire to do something fresh, even showed me a Steve Wozniak Cadillac car commercial on his iPhone that also encouraged me to be inventive," recalls Czapsky on meeting Levinson.

"We decided not to shoot handheld, as Barry felt that had already been done," he adds. "We went for a long-lens look for



Peter Kramer/NBC

Shades of Blue stars Jennifer Lopez as a compromised detective-turned-FBI informant and Ray Liotta as her lieutenant, who begins an all-consuming hunt to find the traitor. Cinematographer Stefan Czapsky, ASC, shot on the ARRI ALEXA Plus, with Angénieux Optimo zooms and old Zeiss T1.3s, noting, "We went for a long-lens look for the show... When we did shoot handheld, it was also about capturing a steady look."

the show instead, also shooting multiple cameras off dollies on Steadicam when it was a better alternative. When we did shoot handheld, it was also about capturing a steady look."

Czapsky chose to stay with the show after shooting the pilot with Levinson, noting that the director "let me do my own thing, and encouraged me to be collaborative in the storytelling. What drove us both was the dramatic story, plus working with great actors who were playing complex characters. Barry trusts that if it's

interesting for him, then it will be for the audience. In terms of the script, we had a number of challenges on set—a big one was how to shoot so many scenes with the action inside driving cars."

On that point, Czapsky adds that Levinson didn't want to shoot the car scenes practically, and in the usual way. With the show shot in New York, a city so gridlocked with traffic, it was impossible to drive for any length of time. Extensive greenscreen work also wasn't in the budget. As a result, Czapsky decided to use large video monitors set up like a diorama around car scenes shot in studio.

"I went out and shot panoramic backgrounds with three Panasonic GH4s mounted on a camera car," he says. "This gave us 180 degrees of material to play on 90-inch monitors that were placed outside the car windows in the studio. We shot with multiple cameras using telephoto lenses that were wide open to bring those backgrounds slightly out of focus, then added reflections on the glass with interactive light also hitting the actors. This felt consistent with the show's look, which features many reflective images."

Continuing his discussion of the crew's creative approach, Czapsky notes various "spy-cam" angles required on the show.

"Harlee gets a spycam necklace to spy on her boss, but quickly gets paranoid and smashes the necklace with her gun," explains Czapsky. "The spy cam footage needed to look different from the rest of the show, so I came up with a mechanical solution based on camera work and tests I'd done previously for *Max*, a film I did last year about a dog and its POV."

Testing a number of miniature cameras, including GoPros and the Blackmagic Pocket Cinema Camera, Czapsky quickly discovered that the Blackmagic was the perfect solution.

"It's very small and records to DNG, which is like shooting RAW," he explains. "I was able to match this footage to the ALEXA, and while it doesn't have the same dynamic range, it looked great when we played it back on a 30-foot screen to analyze."

Czapsky used the Blackmagic with a Lumix 7-14mm zoom attached for the necklace spy camera footage, as it was light and small enough for Lopez to wear around her neck. "It had just enough distortion to look like a spy cam, but not too distorted like, say, a GoPro," he explains. "I could use the camera in places where the ALEXA couldn't fit, such as inside a car or various tight corners. I also used a Zeiss lens to match to my main storytelling lenses. I get great angles on the camera, plus it's fast and easy to use."

Other lenses used with the Blackmagic Pocket Cinema Camera included the Lumix 12-35mm zoom and the Olympus 12mm prime, plus a set of Super 16mm Zeiss primes with a PL to micro 4/3 adapter.

ARRI ALEXA Plus cameras functioned as the main setup on the show, capturing Log C ProRes 444 at 1920x1080. Czapsky also worked with DIT Guillermo Tuñon while teaming up with his regular camera operators, David Taicher on A camera and Eric Tramp on B.

"Getting the right people in key crew positions is crucial in delivering a great show," he expresses. "In early prep, I was



Peter Kramer/NBC

laying out what we needed, and the idea of shooting with the Pocket camera came up. I think the lab wasn't crazy about the idea of shooting it RAW in the DNG format, as they felt it wasn't necessary and the files are so big, far bigger than the ALEXA files. Plus, they take up more lab time, but I knew it would make a huge difference shooting RAW to match with ALEXA footage, so I was relieved when the DIT, who I was working with for the first time, spoke up to support shooting RAW, as he felt it was the best quality for post."

Czapsky shot most of the show on zooms, including the Angénieux Optimo 24-290mm T2.8 lens. "A fantastic zoom that I also have a doubler for, so it could stretch it all the way to 580mm," he reports.

The DP also had three short Angénieux Optimos in hand—the 15-40mm T2.6, the 28-76mm T2.6 and the 45-120mm T2.8—noting their ease shooting handheld or even on Steadicam. "I also had a set of the old Zeiss T1.3 lenses available [18mm, 25mm, 35mm, 50mm, 65mm and 85mm] that I'd use in a pinch, usually when we shot outside with very little time to light or we needed to go with existing light."

Like any DP, Czapsky has strong ideas about lighting, and he's a big fan of Smith-Victor units, especially the Photoflood "scoop" lights.

"They're a very lightweight photoflood bell lamp that I usually use with a 75W bulb, and maybe a piece of paper," he reports. "I've been using them for decades now—very light with the ability to cast soft, but dramatic lighting. They create a very pretty, natural look when shooting people's faces. Aesthetically, I needed to find the right balance between glamour and drama on the show, especially when lighting for Jennifer Lopez and the rest of the cast. The scoops aren't too big, and I can easily and quickly change their position. A lot of shows use huge soft sources, and even when you add egg crates, it's very difficult to take the light away. The key is in controlling the amount of light hitting your actors, especially when different skin tones are next to each other. As a result, I prefer smaller units to larger ones."

Along with these, Czapsky uses other units that he has fashioned himself using LEDs.

"I buy strips of LED bulbs and tape them into aluminum pans," he reveals. "By practice, I'm someone who doesn't want to restrict the director's vision—and I don't want to restrict the actors if they suddenly decide to do something different in any given scene. It's helpful to have lightweight units like this that can be easily moved. Part of my skill as a DP is to quickly position lights in a way that shapes an actor's performance, as seen through the camera, and thereby create the right dramatic mood."

Czapsky cites his use of painter's blue tape, as an example. "I'll take some strips, place them on the ceiling, and tape Velcro® on them before attaching lights to the Velcro®," he says. "I really get off on solving lighting problems, as I have throughout my career."

Czapsky also used Kino Flo Celebs, "especially the 2-foot version," he notes. "They're brighter than my LED pans, and very quick when you need to change their color temperature, plus they have a very nice grid."

Having shot *Max* last year, his first digital movie, Czapsky got on point with working with a DIT and quickly discovered it was possible for his dailies to come out exactly as he intended.

"It's very important to work with your DIT, not just as a data manager, but as a creative part of

your team," he posits. "The DIT is the one who helps you ensure that the look you capture on set survives through the whole process to editorial.

"Shooting my first TV show is the same as doing a movie in terms of what I bring to the project," wraps Czapsky. "The differences revolve around time and budget restrictions, but I've also shot so many low-budget movies that I come in to *Shades of Blue* with the same enthusiasm and goals and, obviously, there's some very interesting and compelling work being created on television right now."

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Peter Kramer/NBC



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Visit the *Shades of Blue* website at nbc.com/shades-of-blue.

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Glidecam Operator, Chad Bonnano, using his GLIDECAM HD-4000.

Photo: Victor Lopez
Athlete: Corey DeMeyers

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DARKEST BEFORE DAWN

If you're suffering from comic book overkill, you're in for a treat watching *Gotham* on Fox, a sinister city captured in gritty realism by DP Crescenzo Notarile, ASC, AIC

BY IAIN BLAIR



DP Crescenzo Notarile, ASC, AIC (center), with Donal Logue (Harvey Bullock) and Ben McKenzie (James Gordon).

Fast-paced and somber, the Fox show *Gotham* expertly balances several storylines at once, featuring David Mazouz as a young Bruce Wayne, Ben McKenzie as Detective James Gordon and Donal Logue as Harvey Bullock, Gordon's sidekick cop partner. The show is as much about the criminals as the good guys, and the iconic Batman characters are still on screen, including The Joker, Catwoman, The Riddler and The Penguin. Now in its second season, *Gotham* has been lauded for its character-driven plots, strong writing and solid acting, all complemented by cinematography that makes great use of moody lighting and incredible sets to underscore the drama at hand.

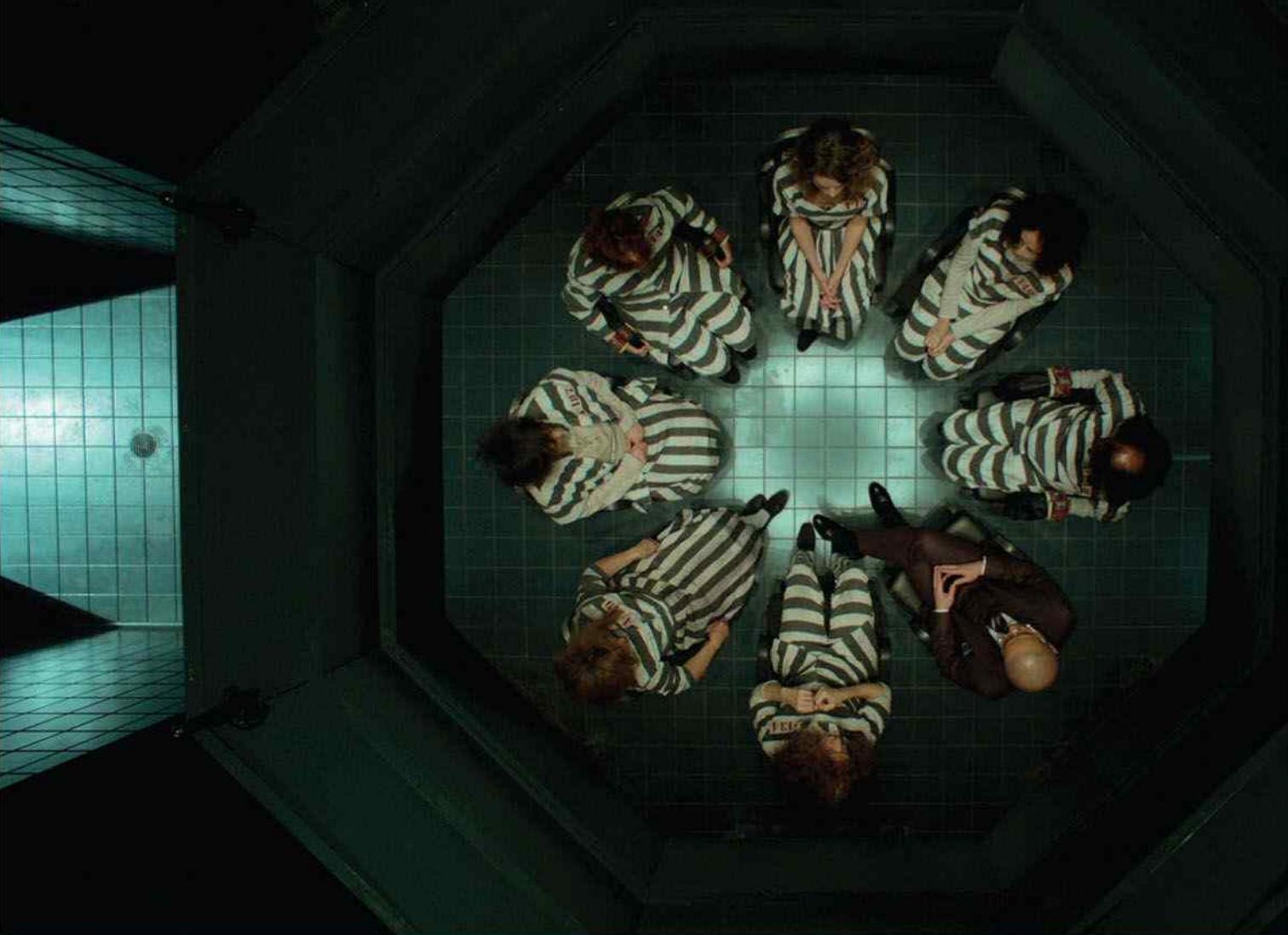
Subtitled "Rise of the Villains," this season has been good news for bad guys, including The Penguin, as well as the other psychotic characters in tow. The show's cinematographers have eagerly embraced the dark side amid the Gothic gloom, lit and

shot by rotating DPs, Crescenzo Notarile, ASC, AIC, and Chris Norr (*Sinister*, *Believe*). Both cinematographers were recently nominated by the ASC for Outstanding Achievement in Cinematography in a Regular Series for their work on *Gotham*. Crescenzo is a veteran of many hit TV shows including *CSI: Crime Scene Investigation* (44 episodes) and *Ghost Whisperer* (41 episodes), and opens our interview noting that *Gotham* is a textured, visceral show with elements of kitsch and comic book flair.

"We have a lot of creative license to raise the bar and stretch it visually," explains Crescenzo on shooting the show with Norr. "We get to reinvent and stylize the show, and add our personal signature. Shooting *Gotham* gives me creative license to think outside the box, to be visually bold and striking, and it's this indulgence that helps sustain visual attention from our audience."

Before starting on *Gotham*, Crescenzo immersed himself in





Gotham chronicles the early years of James Gordon (Ben McKenzie) and Bruce Wayne (David Mazouz), and the origin stories of classic Batman villains. The series is lensed by rotating DPs Crescenzo Notarile, ASC, AIC, and Chris Norr. "We have a lot of creative license to raise the bar and stretch it visually," says Crescenzo on shooting the show with Norr. "We get to reinvent and stylize the show, and add our personal signature. Shooting *Gotham* gives me creative license to think outside the box, to be visually bold and striking, and it's this indulgence that helps sustain visual attention from our audience." Both cinematographers were recently nominated by the ASC for Outstanding Achievement in Cinematography in a Regular Series for their work on *Gotham*.

the look and language of comic strips to prepare himself for the look of the show. "I really loved what I found," he recalls. "*Gotham* has a very strong graphic look, with grand perspectives and wild, imaginative compositions just like the comics. You're often very high looking down or very low looking up, with very little in the middle."

Crescenzo's visual approach was radically different from his previous show, *CSI: Crime Scene Investigation*, where long telephoto lenses were used for close-ups. "All the sets and exteriors have an old-world architecture feel," says Crescenzo of *Gotham*. "We're underneath bridges, in alleyways, in Sin City, with looks that cry out for wide-angle lenses. My lens range is from 17mm to 32mm, with my favorite lens being the 28mm."

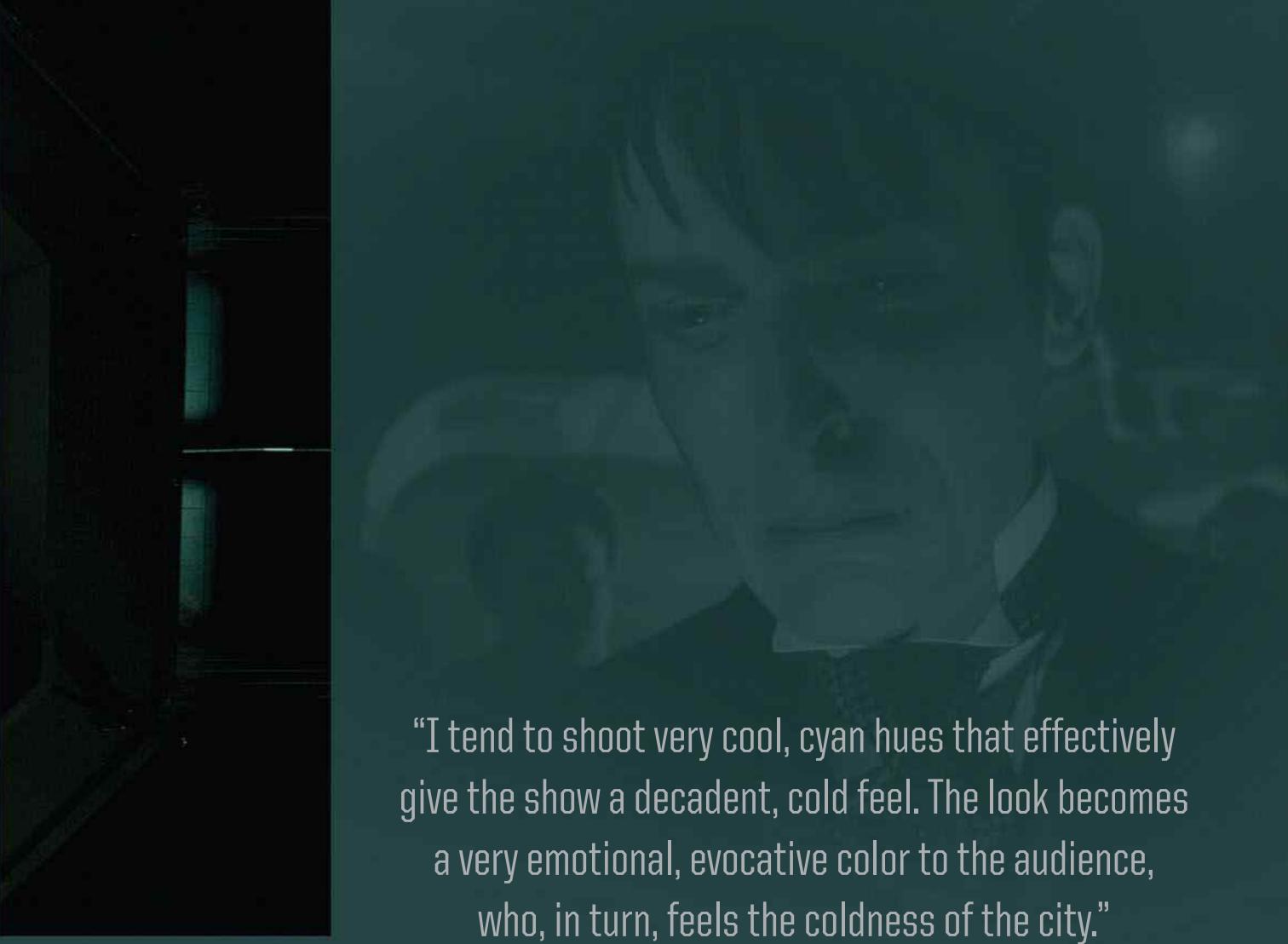
Shooting half the nine-days-per-show schedule on stage at Steiner Studios, Brooklyn, and half on location around the five boroughs of New York City, Crescenzo works closely with his camera operators, Gerard Sava on A camera and Alan Pierce on B.

"They both contribute so much in terms of composition and how to block our actors, as well as moving our cameras around to

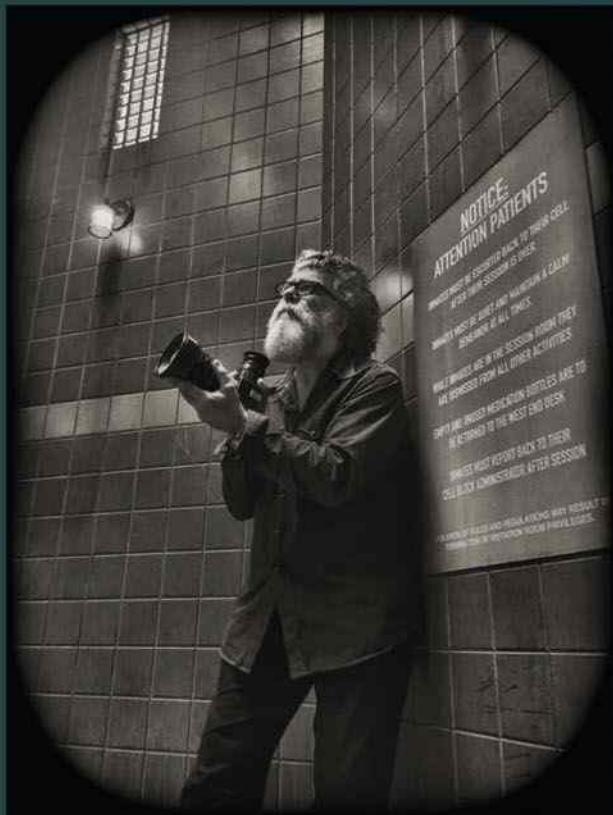
help maintain the show's signature look," he says. "I used zooms most of the time on *CSI*, but we rarely use them on this show. Instead, every shot is calculated on a prime lens to exaggerate the geometry of the composition. Sometimes the image distorts, but this strengthens the 'hero-ness' of the architecture behind the subject in frame. When you're low using wide-angle lenses, the architecture grows like giant skyscrapers looming in the background. In this way, we treat Gotham City like another character."

Crescenzo works with ARRI ALEXA Studio cameras—the main camera is the ALEXA Plus, with the ALEXA Classic used in tandem—and Panavision lenses supplied by Panavision, New York. On occasion, he also uses Canon EOS 5D Mark III equipment for various stunts and crashes and for "precarious camera placements."

Lenses are standard Panavision Prime and Ultra Speed glass, with the occasional use of Primo lenses and zooms. However, Crescenzo favors old standard Primes. "The older Primes are softer and more pleasing to me when shooting the human face because they give you a glamorous, Hollywood motion-picture look," he notes. "They capture texture as opposed to an ultra-sharp image."



"I tend to shoot very cool, cyan hues that effectively give the show a decadent, cold feel. The look becomes a very emotional, evocative color to the audience, who, in turn, feels the coldness of the city."



He also embraces the lights on set. Says Crescenzo, "The old lenses give you very soft and impressionistic flare, another look that I like. I also use close-focus prime lenses that allow me to shoot very close to an actor's face—maybe just six inches away. This distorts the image slightly, but in a good way, and really gives a character's face more of a 3D feel, as well."

Lighting is mainly from a soft source, from 18K Sunrays and 20K Mole-Richardsons to 5K beam projectors, 12K Pars and Xenons. "Those beams of light are another visual signature on the show," he adds, taking creative license with light placement when on set. "I'll use light coming through windows and doorways, and add smoke in almost every shot to soften the air and enhance the light. I love to compose around those beams of light."

Discussing on-set tools, it's clear that the Technocrane is one of Crescenzo's favorite tools. "I use it to get very low, wide-angle shots with the camera touching the ground," he notes. "Very effective on extreme perspectives—and a great tool for adding a comic-strip perspective to any given scene."

Gotham is captured in ProRes 444 at 1920x1080 resolution in 12-bit Log.C. "We record to 32 GB and 64 GB Sony SxS cards and download using 'ARRI On-Set' to check results on location, then send that footage with a DPX reference photo and separate CDL [color decision list] file per scene that exhibit any changes we make on set."



Lighting *Gotham* on set is mainly by way of soft sources—from 18K Sunrays and 20K Mole-Richardsons to 5K beam projectors, 12K Pars and Xenons. Explains Crescenzo, “Those beams of light are another visual signature on the show. I’ll use light coming through windows and doorways, and add smoke in almost every shot to soften the air and enhance the light. I love to compose around those beams of light.”

Crescenzo also has his “look” set on monitors for reference. “It’s Rec. 709, and from that look, we get a vision of what we’re doing in terms of color palette, density and saturation,” he continues. “I find myself going very monochromatic on the show, as opposed to the lush, saturated look I went for on *CSI*. I tend to shoot very cool, cyan hues that effectively give the show a decadent, cold feel. The look becomes a very emotional, evocative color to the audience, who, in turn, feels the coldness of the city.”

Crescenzo works closely with production designer Richard Berg and costume designers John Glaser and Patrick Wiley on set, discussing the color palette to be used in each set in addition to costumes and textiles.

“I compose for widescreen in 16x9 aspect ratio of 1.78:1, so we have a very wide motion-picture feel on the show,” he adds. “Usually, when people shoot with ALEXAs, they work at a base sensitivity of 800 ISO, thereby giving you seven stops of latitude in highlights and seven stops in shadows. I like to manipulate the camera’s sensitivity, as sometimes I need less detail in the highlights and more in the shadow, or vice versa. It depends how I feel when I’m shooting a scene, and I personally like it when my blacks go inky with very deep contrast.”

In terms of the show’s digital workflow, Crescenzo works closely with DIT Dan Brosnan. “We sit shoulder-to-shoulder on set and manipulate the images together,” he reveals. “He’s my strongest ally and liaison for my look and vision, along with my camera crew on set. We all use headsets. It’s very rare for me to have the luxury of a DIT.”

He notes this method is unorthodox. “Most elect to manipulate the image later when they go into color correction, but I like to bake it in on set whenever I can,” he reveals. “Dan helps me with that language, and if I like the look, I sign off on it. Dan will also take a picture of the look on his monitor for reference, so the lab also gets a portfolio of pictures to indicate how I want the image to appear.”

Other key members of Crescenzo’s team include his dailies colorist, Company 3’s John Bonta. When it comes to dailies, Crescenzo admits to having an old-school methodology.

“Each shoot day at lunch I email John my work for the first half of the day, and send along all my notes regarding the color scheme I’m going for,” he explains. “I have to communicate exactly what the look is, and be very specific about the temperature I want. I’ll also send the second half of my dailies when we



wrap. Then, first thing in the morning, when John is walking out of the graveyard shift, we'll discuss everything before I start shooting again."

Final color correction then goes to Encore in Los Angeles, performed by Crescenzo's longtime colorist Paul Westerbeck. "He's the most important person, a true artist and technician, just like a detailed paintbrush in my darkroom," explains Crescenzo. "Once an episode is locked, I immediately go to him with a copy, sit in an editing bay and shuttle through the picture. I stop and freeze throughout the entire episode writing various notes. Do I want it cooler or warmer? Do I need to add contrast? Should I shape the image a little more with deep-focusing or neutral-density edges? This can be a painstaking process; not so with Paul. His ASC nomination [for Outstanding Color Grading, CSI: *Crime Scene Investigation*] is a testament to his genius."

For Crescenzo, *Gotham* has become a wonderful opportunity for him to experiment as a cinematographer. "You have such great creative leeway to make bold, audacious imagery that doesn't have to make perfect sense in the real world," he says. "We're creating our own world here, and I'm very proud of our signature look that acts as yet another character on a compelling show."

Gotham is led by executive producer Danny Cannon, producer Scott White and show creator/executive producer Bruno Heller.

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Visit the *Gotham* website at fox.com/gotham.

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COLLISION COURSE

Cinematographer Ed Wild brings distinctive lighting to a film set full of high-tech auto gear and extensive car chases in *Collide*

BY VALENTINA I. VALENTINI

As thrilling and challenging as it is for any cinematographer to shoot Jaguars racing down the Autobahn highway system in Germany or capturing BMWs flipping over multiple times, cinematographer Ed Wild was also tasked with creating very different and distinct lighting palettes for scenes in the action thriller/love story *Collide*.

Written and directed by Eran Creevy, the film stars Nicholas Hoult, Felicity Jones, Anthony Hopkins and Ben Kingsley. Wild had 48 days to capture footage, with only 10 days dedicated to shooting car chases and motor mayhem on the Autobahn.

"We wanted to capture the film in a way that felt effortless and contemporary," notes Wild of the shoot. "There was an Instagram-type theme for the club scenes, then the action scenes were shot in both day and night. It was incredible fun working with so many emotional rhythms and lighting styles."

Collide marks Wild and Creevy's third collaboration, and this time they wanted the film to have a more chaotic look. They stayed away from the constructed feel of their last collaboration (*Welcome to the Punch*), instead going for more responsive, intuitive camerawork that pops with action and colors. To that end, Wild tested the ARRI ALEXA, the RED DRAGON and the RED EPIC, and decided on the latter.

"I think the EPIC enjoys color a bit more than the ALEXA," overviews Wild. "In an action film that you're shooting at 5K, where the director wants to push in a little, you're not sweating bullets in the DI because the EPIC still has room to give."

Wild used Tiffen Classic Softs for filtration on Cooke S4 lenses and liked what they did with the highlights, allowing the light to flow more easily, making skin detail softer while not softening the image overall.

Because Wild and Creevy wanted to revel in color, the balance of hues within scenes was considered carefully with production designer Joel Collins and costume designer Sharon Gilham. As a result, although the film feels free and naturalistic, no colors outweigh any others. This helped to keep the grade simple and rich.

"That richness in the grade comes together so well in the club scene where Casey [Hoult] meets his employer Geran [Kingsley], and then Juliette [Jones] meets Casey for the first time," explains Wild. "Eran spent his youth MC-ing, so was adamant that the club scene felt authentic. He knew without people having a real party it would feel fake, especially on the scale of the shoot."



COLLISION COURSE

Tom Trambow

Working with club promoters to set up a real club night at an existing outdoor venue, Wild shot wide shots with a crowd of 700 people one night followed by an interior and a smaller exterior bar set the following night. He felt the location would look best if they used more old-school rock 'n' roll lighting rather than standard electronic moving lights.

"It just reflected the industrial textures and scale of the location much better," explains Wild. "My gaffer Jochen [Kratzheller] placed lots of big broad lighting units high up on cherry pickers together with some Par cans. This all went back to a dimmer and allowed us to adapt quickly to any angle we wanted to shoot."

The real fun for Wild came when he shot dialogue between Casey and Juliette the very first time they meet from within the crowd. It was so loud with the actual club-goers and music that the crew was struggling to hear each other, never mind capturing the dialogue. But that didn't stop Wild from seeing through the lens to eye the chemistry afoot between the two actors. Creevy had always wanted this film to be a love story with action surrounding it, so that chemistry was essential to his vision.

Wild was a natural choice for Creevy. The pair met while he was directing music videos, and a bond between the two was immediately cast when Wild gave multiple options on how to tackle any given scene.

"You need that as a director, someone who has your back because you don't always have all the answers," says Creevy. "I'm very bombastic and often describe what I want in a series

of colorful and energetic onomatopoeias. Ed has the skill to interpret that energy and channel it into a structured, rigid game plan to give me exactly what I asked for."

For *Collide*, Creevy wanted to infuse the film with a sense of realism and energy throughout, particularly during the action sequences. As Wild explains it, "well-thought-out, interestingly choreographed action that could then be captured in an immediate way."

As a result, the team tried to stay away from big balletic action sequences that would require VFX or greenscreen, instead keeping the whole experience believable and visceral.

"The tensions, dilemmas and crises of Casey throughout the film have to feel raw," says Wild. "We had the camera react to action and dialogue, and not be waiting for it. Casey is running, stumbling at full speed with no plan, toward the end of the story, and the camera does the same thing, discovering things as Casey does. Conversely, Eran likes to get strong frames even when they're captured reactively, so there's a lot of pressure to get all the cameras in the right place to get him those frames for what often was one take."

For tracking during the car chase scenes, a gyro-stabilized Russian Arm system was used, while crane shots allowed the capture of specific sequences so the audience doesn't get lost in a flurry of fast cars and action.

Wild's favorite tool was a BMW M3, outfitted with hard mounts to the chassis front and back with a VariZoom head.

"We all loved how much lower this could get us to the ground compared to the Russian Arm," notes Wild. "For the big Autobahn shoot days, we combined our main unit and second unit so that [second unit director] Stuart Howell and I could share duties operating the BMW camera and the Russian Arm. Some of the best shots came from him instinctively reacting as things unfurled."

Wild shot a lot of Casey's action in the car using a stunt pod car—a unit attached to the car roof controlled by stunt drivers inside and then digitally removed in post—for as much of the driving as possible, shaping shots that connected Casey to the action around him. Making sure they could see it was Casey from the outside of the car was essential, so the crew needed to build up the interior light level. Gaffer Kratzheller arrived on the team's first test day with the perfect tool, a new lamp called

a Creamsource, a battery-powered LED with high output.

"I loved this light," Wild explains. "We were able to put it low in the passenger seat to hit Casey's face, and to add roundness to the light, we made blankets of LED strips inside of them. The Maier Bros. lighting company helped put these strips on wireless dimming, using orange LED strips to mimic daylight. We could warm the fill light easily as we started to shoot toward the approaching sunset. These worked so well that we started to find more uses for them all the way through the shoot."

For parts of a sequence where Casey drives along a roadside trench, Hoult actually did his own stunts, as it was too rough for a pod to be mounted on the top of the car. Stunt Supervisor Carl Stück felt it was safe enough since there were no other vehicles involved.

"We got some great shots of Nick really fighting to control



All photos by Tom Trambow

Collide is an action thriller/love story set in Germany, starring Nicholas Hoult as a backpacker who gets involved with drug smugglers, with Felicity Jones, Anthony Hopkins and Ben Kingsley. Writer-director Eran Creevy tasked cinematographer Ed Wild with creating the film's realistic, yet rich look. Shot on the RED EPIC and Cooke S4s, lighting challenges ranged from an outdoor club scene with a crowd of 700 to frenetic car chases on the Autobahn.



All photos by Tom Trambow

In addition to a gyro-stabilized Russian Arm, one of Wild's favorite tools to shoot the Autobahn sequences was a BMW M3, outfitted with hard mounts to the chassis front and back with a VariZoom head. Notes the DP, "We all loved how much lower this could get us to the ground compared to the Russian Arm. For the big Autobahn shoot days, we combined our main unit and second unit so... Stuart Howell and I could share duties operating the BMW camera and the Russian Arm."



the car," recalls Wild. "It's hard to fake that sort of thing."

Wild knew they would need a certain amount of greenscreen shots, so background plates needed to be filmed as the action unfolded. To achieve this, a Porcupine car was built on top of a Volkswagen Golf, with enough Blackmagic 2K cameras attached using 12mm lenses bolted onto the sides at various angles to create a 180° sphere of images. This allowed them to stitch together background plates for greenscreen sequences.

The car was rigged by Action Concept, the production company in Cologne, Germany, where the film was shot (they also worked on all the SFX and stunt work), so the stunt driver could drive the VW through the sequences as an exact repeat, minus the actual impact stunts.

For trickier stunt sequences where they wanted Casey driving, they would hard-mount cameras to the pod car without Hoult in it and then shoot him in greenscreen. This allowed the DP and crew to maintain the blurred line between the real and greenscreen shots in order to keep the audience feeling they were immersed in a real situation.

"It all tied together with the idea of always keeping Casey's character fully immersed and present in the sequences," says Wild. "This was complemented by choreographed developing shots of Casey as the action and story moved forward. We punctuated these relatively longer developing action shots with some crash cameras, where we used Blackmagic Pocket Cinema Cameras that are small enough to be hidden, so we even used them simultaneously with the main cameras."

All of the action shots are done in direct contrast to the look and feel of the story where flashbacks reveal Casey and Juliette falling in love. For those scenes, Wild had a closer, more intimate camera style using fractured light that rolled into soft shadows.

"We wanted this film to have a real heart and soul," Wild concludes. "That led us to create a look that feels real, yet rich, and nuanced to the different emotional rhythms of the diverse scenarios within the original script."

HDVP

Collide is slated for release on April 1, and will be distributed by Open Road Films (openroadfilms.com) in the U.S.

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BORIS CONTINUUM COMPLETE

Offering powerful VFX plug-ins, from artistic filters to restoration tools to 3D objects, with thousands of presets, BCC 10 from Boris FX lets you reach your creative goals faster

BY JUSTIN SUCARA

Boris Continuum Complete (BCC) is a comprehensive set of over 230 VFX plug-ins designed to complement postproduction tasks—from editing and effects, to graphics and finishing. Prior to sampling the tools in the new BCC 10 release, I honestly was a bit skeptical; I've never used Boris plug-ins, and the company's website and branding don't match my personal design aesthetic. After testing the suite for a week, however, I admit I was wrong—BCC 10 is a professional-quality effects package that can be compared to plug-in tools from companies like GenArts and Red Giant.

First of all, BCC 10 is blazingly fast in comparison to the standard effects in Adobe After Effects and Premiere or Avid Media Composer. BCC effects are GPU-accelerated through OpenCL, making previews interactive and saving lots of time on renders. For example, I was able to apply six film effects (including film grain, which is typically render-intensive) and build a preview in half the time of just one instance of the native film grain effect in AE.

In addition to performance, one of the key new features in every BCC 10 effect is integrated mocha tools. Boris recently acquired Imagineer Systems, and together they have added the power of mocha tracking and masking into every effect. This

integration gives the user power to isolate effects and do advanced compositing such as blurring logos and faces.

While AE users have been enjoying the bundled mocha AE for years, this integration brings Academy Award®-winning mocha tools to Avid and Premiere editors. In addition to incorporating mocha, BCC helps simplify your effects stack by allowing you to directly matte effects using the PixelChooser, a quick way to generate mattes using luma, channels or keys. That, along with a handful of preset mask shapes and various blending options, helps you combine several effects into one, resulting in a cleaner effects stack.

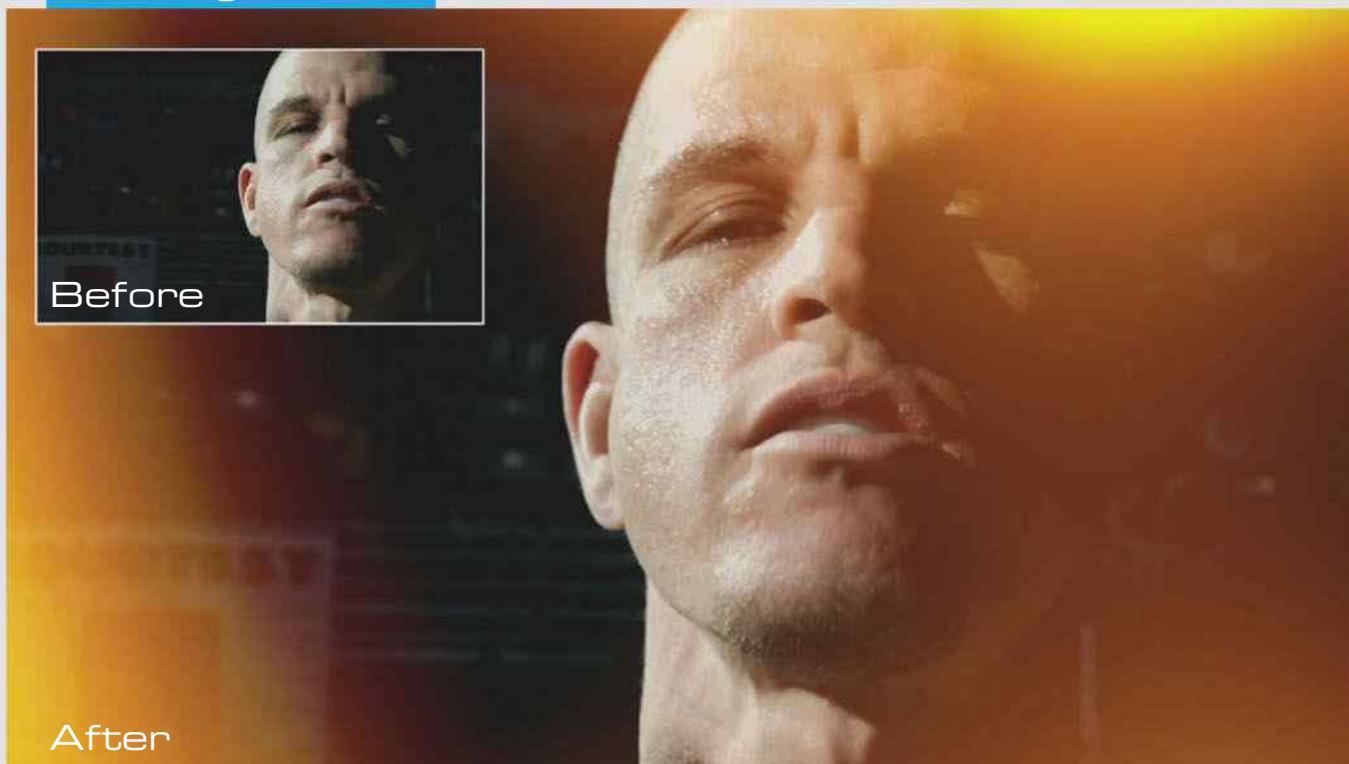
BCC effects also include useful integrated tools for previewing and keyframing. The FX Browser helps showcase one of the suite's important features: thousands of presets. BCC's filters have a built-in browser that helps you quickly choose and compare from a large library of looks, presets and effects transitions.

Another useful feature is Beat Reactor. Similar to how mocha is integrated, Beat Reactor allows you to do much more within each effect to drive animations. It's able to analyze an audio track and control keyframes based on the beats and tones, similar to Trapcode's Sound Keys. Using tools like this can really help make your animations more dynamic.

BCC PixelChooser

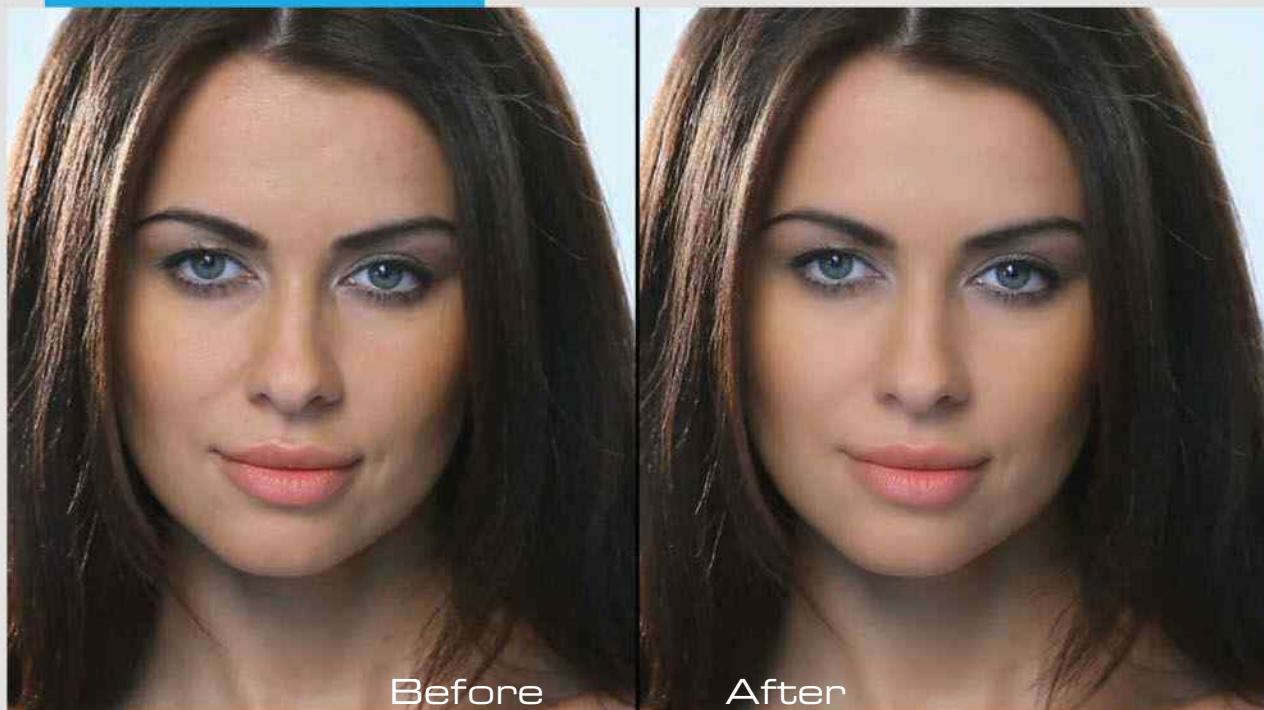


BCC Light Leaks

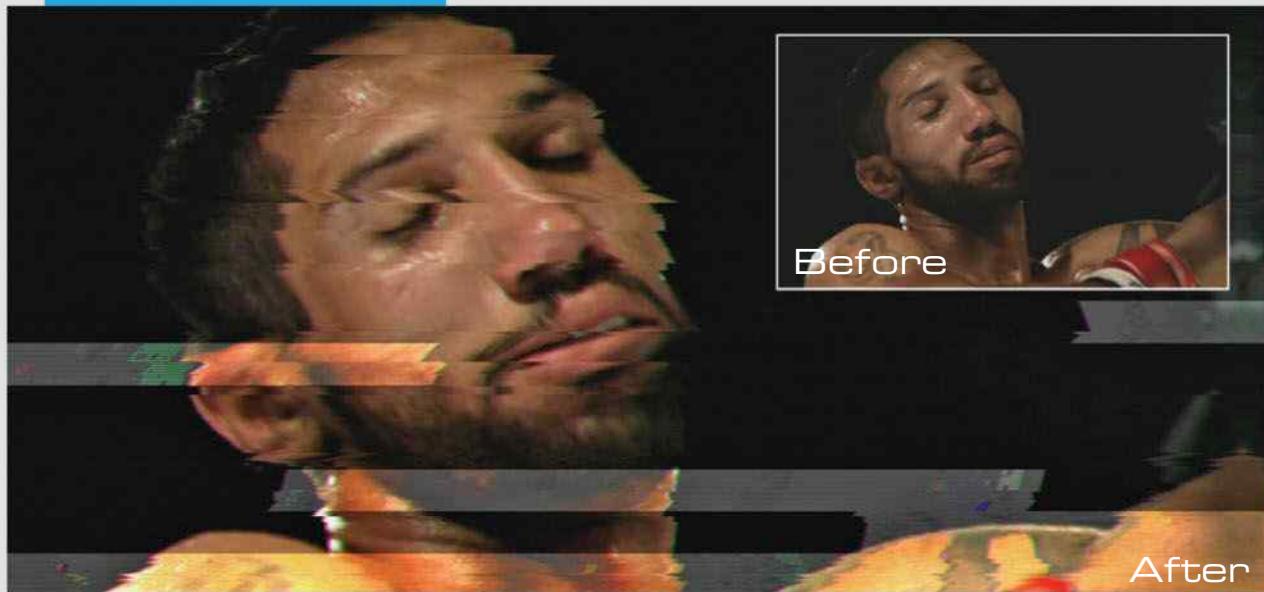


TOP: In the improved PixelChooser, Boris FX has integrated powerful mocha planar tracking and masking tools, which are available in all BCC 10 plug-ins. ABOVE: The new Light Leaks effect is an organic film exposure look that can be applied as a clip effect or as a transition.

BCC Beauty Studio



BCC Video Glitch



ABOVE: The new Beauty Studio plug-in brings advanced skin smoothing and retouching tools to your editing timeline. TOP: The new Video Glitch effect simulates signal loss and corrupt digital video for unique looks and transitions.

Diving into the effects, there are many areas where BCC 10 shines. One of my favorite units, Lights, offers some nice effects that can be used for both motion graphics and visual effects. Lens Flare 3D is a good alternative to the popular Optical Flares plug-in from Video Copilot. While the presets may not be as nice, it does provide the same custom options to build your own lens flares.

Coming from Optical Flares, I like how BCC 10 allows you to create a flare directly in the comp view rather than in a separate GUI window. It's more useful to see the flare in context of your composition while editing it. The new Light Leaks is a great effect that can produce the popular vintage look. Adding Light

Leaks can really tie a comp together with atmospheric effects.

One of my favorite parts of BCC is the Particles unit. Trapcode Particular and Form users should be able to handily navigate these effects. You'll find some familiar parameters, plus a lot more. Particle Emitter 3D offers many default particle sprites and even a few 3D shapes like spheres, cubes and cylinders. While I didn't have a lot of time to play with it, this effect is impressive, and I'm intrigued to see what it's truly capable of. One critique of BCC Particles is there seems to be too many one-use effects such as Snow, Comet and Sparks. Rather than combining them into one effect, I find Boris sometimes provides too many single-use

effects that can make this large suite feel overwhelming at times.

In addition to creative effects, a real strength of BCC 10 is found in the Image Restoration unit. These tools are designed to fix and improve footage. The new Beauty Studio filter can easily smooth skin and remove unwanted blemishes while retaining natural sharpness and contrast. With the integrated mocha, Beauty Studio helps make beauty work relatively painless and will allow editors to do more advanced finishing without relying on an effects artist.

Other new Image Restoration tools include Reframer, designed to be applied to footage shot on a smartphone in vertical position and quickly prepare it for broadcast, and Remover, which is essentially a clone effect to remove logos or unwanted objects.

While there are many good qualities to BCC 10, there are a few weaknesses. The 3D Objects filters have some useful 3D titling and extrusion tools, such as the new Title Studio plug-in. Title Studio is definitely designed more for editors to create lower-third animations or broadcast graphics and opens its own somewhat clumsy interface. Title Studio doesn't offer much of an alternative to the AE native Cineware plug-in or Video Copilot's Element 3D, so it may be used by designers creating high-end title sequences.

Overall, BCC 10 is an impressive arsenal of powerful effects ranging from artistic filters and restoration tools to particle systems and 3D objects. With the incorporation of features like mocha and an easily navigable FX Browser, users can quickly achieve their creative goals.

While there are some shortcomings and a lack of polish in some effects, the new annual multi-host subscription option makes BCC 10 a compelling value proposition for professional post facilities, especially considering it will take multiple products from different vendors to equal the depth of this wide toolset.

BCC 10 is available for Avid Media Composer, and Adobe Premiere and After Effects. Host support for DaVinci Resolve, Apple Final Cut Pro and other systems is coming soon. List Price: \$595 (annual subscription/multi-host); \$1,695 new/\$595 upgrade (for Avid); \$995 new/\$295 upgrade (for Adobe). HDVP

Learn more about BCC 10 at borisfx.com.

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A Magic Wand For Video

Giving Steadicam a run for their money, the DJI Osmo is a new handheld camera capable of full 4K with built-in 3-axis stabilization

By David Alexander Willis

Based on the gimbal and camera system of DJI's \$3,000 Inspire 1 quadcopter, the Osmo is the company's first handheld camera solution, and, as a bonus, it gives video the same feel and buttery smoothness as a drone. At dimensions of 2.4x1.9x6.4 inches and a weight of only 221 grams (base model; it's a bit more than a pound with all attachments), the Osmo is extremely portable, even including a tailored case for travel.

The three supported axes give you tilt (-35° to +135°), roll (+/-30°) and yaw (+/-320°) for even-handed swivel, with pitch available at up to 120° a second for insanely fast, yet extremely level panning. As it does with their flight-capable systems, the DJI GO app for iOS and Android provides controls for gimbal changes and settings. This is the only way to access many of these controls on the Osmo, as there's no monitor, but WiFi communication will stream a live video feed to a nearby phone (82 feet), which is then recorded as an HD proxy on your phone for review and initial edit choices. A 116x30x34mm phone mount will extend from the Osmo handgrip to accommodate even the largest phones like an iPhone 6s Plus.

The Osmo handle mount houses a pistol grip with trigger, as well as a thumb-control joystick on the rear. A single tap on the trigger locks the camera down for controlling movements, while two taps secures the camera into place on the handle so it will point in the direction that you're moving without capturing any shake. Useful for bloggers and interviews, there's also a three-tap "selfie" mode that automatically turns the camera 180° to view the holder. The joystick can be used to maneuver the Osmo's camera head, and the handle

also can be held ergonomically in flashlight, low-to-the-ground or swivel mode.

For anyone looking for a drone system or for those who already own an Inspire 1, the Osmo is a no-brainer. The X3 camera system of the Inspire 1 (model FC350) can be used on the Osmo hand mount, which is also available at less than \$300 as an Osmo handle kit, so you can go both handheld and aerial without needing to purchase the full camera solution version of the Osmo. You can't use the Osmo's native X3 camera (model X3/FC350H) on the Inspire 1, however. Though it does seem to have the exact same specifications on paper, DJI says there are several mechanical differences between the two cameras.

DJI is actively going after the GoPro market with the Osmo; however, it's not waterproof or shockproof. Regardless, there's a huge variety of mounts and rigging gear for everything from bikes to tripods to vehicles. A Universal Mount is also available for adding a microphone or light, ideal as the onboard stereo mic easily picks up the internal fan and gimbal sounds to the point where it even ruins ambient capture. A 3.5mm jack is housed on the Osmo, which, of course, doesn't power external mics, and it won't work with professionally balanced XLR options. DJI says the Osmo will last for 60 minutes on a single 980 mAh battery charge and up to six hours in stand-by. It takes an hour to charge the batteries; currently, extra batteries are only for sale on preorder.

File formats are captured in MP4/ MOV (MPEG-4 AVC/H.264) with a max bit-rate of 60 Mbps. The Osmo includes a 16 GB MicroSD and will work with up to 64 GB cards. At 60 Mbps, 4K video eats up a 16 GB card



in roughly 30 minutes. Also, thanks to such a small sensor, the ISO is an abysmal 100-3200 with video and even less for photos at a range of up to ISO 1600. Keep in mind that with the native

Zenmuse X3 camera, the Osmo is capturing 4K to a diminutive 1/2.3" Sony Exmor R CMOS 12.4-megapixel sensor. In contrast to the more fisheye feel of most action cams, the nine-layer lens on the Osmo is a 20mm in 35mm equivalence, with a very non-barreling 94° field of view at f/2.8, though with the 1/2.3" sensor, that translates to an f-stop of f/15.8.

The camera is still very versatile for its price, however. Frame rates are available in full 4K at 24/25 fps while UHD and 2.7K also offer 30 fps. High-definition frame rates in 1080/720 clock in at fps of 24/25/30/48/50/60p alongside a special slow-motion rate of 120 fps in 1080p. Optionally, the Micro Four Thirds-based X5 and X5R (which adds RAW video capability and is soon to be available) cameras are also compatible through a separate adapter. Both X5 cameras are capable of 16-megapixel stills, much better light sensitivity, and the same resolutions and frame rates on a sensor about eight times bigger than that of the X3.

Time-lapse and interval shooting are also offered, though specs aren't available on that. The camera includes a few supplemental features, as well, such as an automatic 360° panorama mode, long-exposure photos at up to two seconds, photo bursting in 3/5/7 fps and auto-exposure bracketing at 3/5 bracketed frames with 0.7 EV bias. ND8 and ND16 filters can be purchased separately.

While the Osmo system definitely has its downsides, at the same price point as a low-level stabilization system from Steadicam or Glidecam, you're gaining a very capable camera that also can capture full 4K. While the specs don't necessarily make it a good choice for an A-cam, by any means, the Osmo is certainly better in many ways than a GoPro or alternative action camera, especially as there aren't too many live-view systems available with such hefty stabilization at this pricing at all. No doubt the next iteration will be even better. In comparison, DJI's latest Phantom 3 4K quadcopter is literally miles ahead of the first Phantom release.

List Price: \$649 (DJI Osmo); \$2,199 (Zenmuse X5 camera; requires an adapter not yet available). **HDVP**

Visit the DJI website at dji.com.

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MISINFORMATION

(Cont'd from page 72)

of the content of the signals. It does need to decode audio for my surround system, and it can connect with my iPad to play back music from it. But one thing that it does need to know about is packaging and security protocols, in order to "handshake" or negotiate with the display to make sure it can legally deliver a protected signal to the display.

The most common example of wired security protocols is contained in the HDMI (High-Definition Multimedia Interface) connection on most modern display devices. The HDMI connection is subject to the restrictions of the HDCP (High-Bandwidth Digital Content Protection) scheme, which is designed to make sure the rights of copyright owners aren't compromised by pirates. One side effect of this protection is that users with legitimate authority to access material are often stymied in attempts to improve the presentation of the material without spending thousands of dollars for new hardware when manufacturers upgrade the protection schemes to match the march of delivery and display technologies.

For example, you may have noticed that Blu-ray players no longer have HD component analog outputs. Those of us who grew up in the 20th century dealt with the transition from analog composite (NTSC in North America), through analog component (think Betacam format), through analog high definition (yes, there was analog HD), to digital component HD and the most common interface—SDI (Serial Digital Interface). None of those had effective copy protection schemes, but there were hardware-specific attempts that usually degraded the video, although back then, most hardware degraded the video. Today's digital systems are almost transparent, compared to analog ones... but I digress.

HDMI is the consumer development of wired digital HD distribution technology, so a lot of effort was invested in keeping those high-quality program streams from being diverted to easily replicated mass-media packages that would divert mass quantities of income from the original producers and distribution companies. Breaking down digital HD signals to analog component made copying a little too easy for the corporate lawyers, hence

HDCP. Cable interface boxes, Blu-ray players, media servers, home computers, cameras, video games, direct-view displays and projectors all use HDMI, so any home theater video controller or router needs to play nicely (and legally) with HDMI and HDCP protocols.

One of the most annoying "features" of HDMI/HDCP connections is that every time you switch between sources (for example, pausing a Blu-ray or streaming movie to check on the score of the game you'd rather be watching), the devices need to renegotiate the protection agreement, call in a couple of lawyers, make sure your request is legal, then make the new connection (and, of course, repeat the process on the way back to the movie). Obviously, I'm exaggerating, but only in the process; the frustration is quite real.

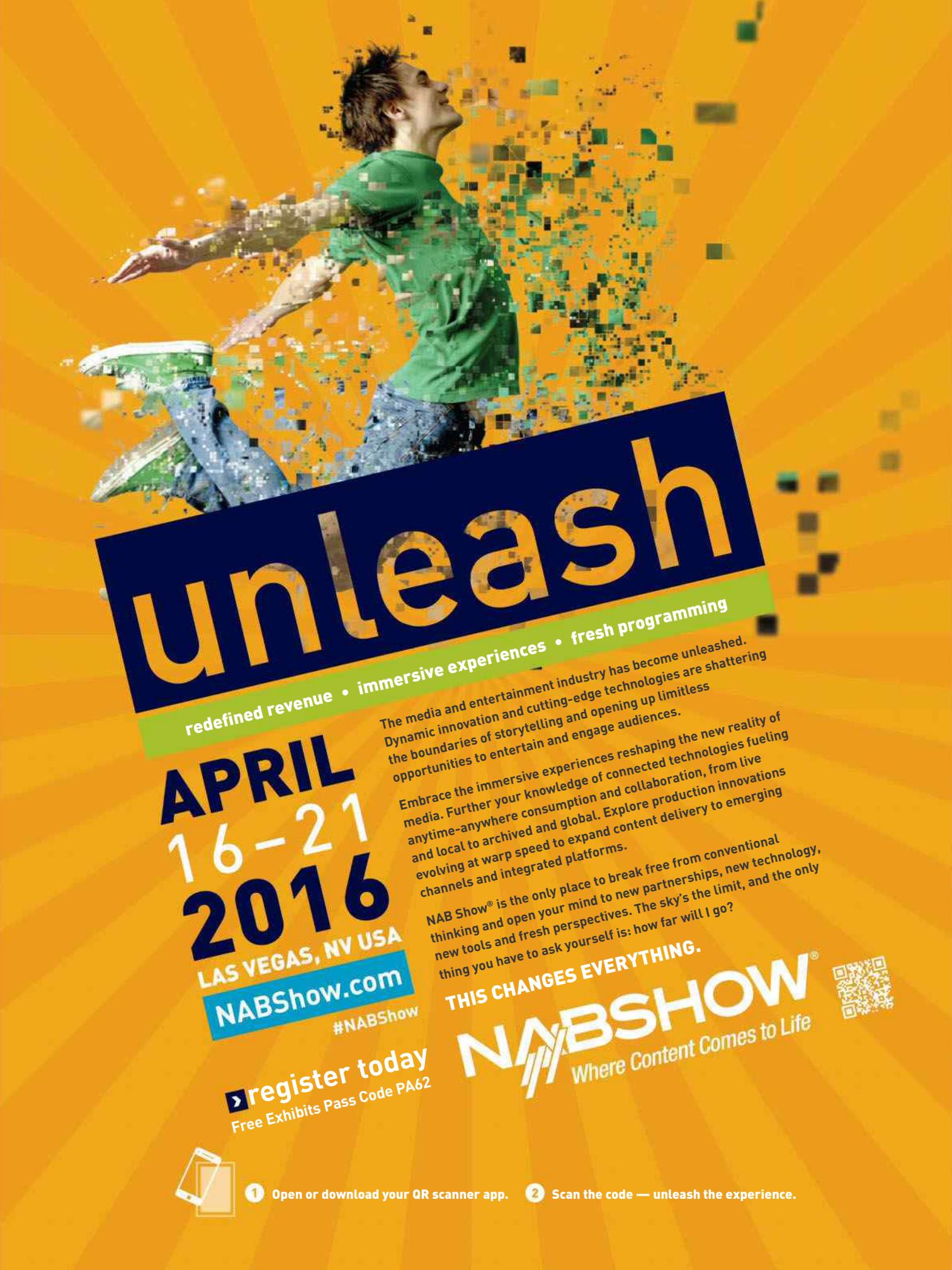
Another issue is the difficulty of driving multiple displays from one HDMI source. You can buy splitters, but if the display devices aren't identical (and even sometimes when they are), you can experience hair-pulling frustration getting them all to display anything. With the advent of 4K or UHD signals, HDCP 2.2 was introduced, and many older devices aren't able to negotiate that protocol. You'll still be able to use your older sources with newer displays, and possibly pass through new sources, but you won't be able to take advantage of all the new features without upgrading your receiver or other processors. Sometimes, a software update is required; otherwise, get out your wallet again because it will cost you.

Home theaters can be described much like houses and boats; they're money pits that continually help you reduce your retirement nest egg—but they can be lots of fun for techies. In future columns, I'll try to expand on the trials and tribulations of optimizing viewing quality as the tornado of technological advance swirls around your system.

So much "mis-information," so little time....

HDVP

C.R. Caillouet is a technical producer and video engineer who has worked in TV production, from preproduction through field acquisition to postproduction and presentation, as well as for NASA, Sony and Panasonic. He's currently Technical Director of the Jackson Hole Wildlife Film Festival and Science Media Symposium.



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An alphabet soup of output formats for television and streaming systems

By C.R. Caillouet

Last month, I talked about shooting in 4K or UHD, but does "4 times full HD" make any sense elsewhere in the delivery chain? I suggested that the UHD shooting decision should be driven by what most viewers actually see, and I noted that it might make sense to put more bits into dynamic range or improved color, instead of more resolution. We should also ask if our delivery systems can handle any more bits. The answers will differ for each delivery system. Most of us already have limitations placed on our viewing by streaming bandwidth limits, marginal cable performance and interference in over-the-air signals. Trying to cram more bits through the paths from camera to display will further stretch those limitations and eventually break the system at the weakest links. The results may be longer download or buffer times, breakup in the middle of a program (really fun if you're trying to watch a ball game) or video freeze-frames and/or audio dropouts every few minutes (annoying, even if you don't miss much content).

Each type of delivery medium has its own performance strengths and weaknesses, in addition to its costs and conveniences. How those match up with individual viewer preferences will affect our selections between the multiple content sources now competing for our attention. Most of us have a favorite viewing area, be it a TV set in the living room or family room, or a "tricked-out" dedicated viewing room, with big screen and surround sound, and equipped for viewing whatever media is available via the



delivery system "du jour."

Home viewing areas define the places where the signal meets the viewer, where the digits become analog again, where audio and video become sound and image. Today's home theater needs options for several different source types. I just installed a new receiver that can pass several UHD or HD signals through to my video display. One could come from an Ultra Blu-ray (UHD) or a standard Blu-ray player (HD), another from my cable box (also limited to HD) and another from a streaming server. The server video might be HD, UHD (3840x2160) or full 4K (4096x2160), but the time necessary to download a higher-resolution signal undoubtedly will be longer than for a corresponding HD version. It probably won't be four

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times as long because different trade-offs will be made to get the bandwidth down. But that also means the picture won't be four times as "good" as the HD. Which aspects of "good" are compromised depends on which of those trade-offs were made...and where...and by whom...and with what processors.

You may want to experience 3D programming in your system, or you may be experimenting with virtual reality or some other advanced technique that may be limited to lower resolution in its early stages. My receiver will pass those signals through, even though it doesn't need to know anything about them; the display device needs to figure out how to handle the funny stuff. In fact, the receiver doesn't really care about most

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